ELECTIONS BC
A non-partisan Office of the Legislature

DOC
BC
E378
D:R4B6
2009
c.3

Report of the Chief Electoral Officer on the 2008 Electoral Boundary Redistribution

LEGISLATIVE LIBRARY
VICTORIA BC V8V 1X4 OCT 20 2009

Library and Archives Canada Cataloguing in Publication

British Columbia. Chief Electoral Officer
Report of the Chief Electoral Officer on the 2008 electoral boundary redistribution.

ISBN 978-0-7726-6197-5

1. Election districts--British Columbia. 2. British Columbia. Legislative Assembly--Election districts. 3. Redistribution (Election law)--British Columbia. I. Elections BC II. Title.

JL426.R4B74 2009 328.711'07345 C2009-905624-0

ELECTIONS BC
Province of British Columbia

Mailing Address:
PO Box 9275 Stn Prov Govt
Victoria BC V8W 9J6

Phone: 250-387-5305
Toll-free: 1-800-661-8683/ TTY 1-888-456-5448
Fax: 250-387-3578
Toll-free Fax: 1-866-466-0665
Email: electionsbc@elections.bc.ca
Website: www.elections.bc.ca

October 19, 2009

The Honourable Bill Barisoff
Speaker of the Legislative Assembly
Province of British Columbia
Parliament Buildings
Victoria, British Columbia
V8V 1X4

Honourable Speaker:

I have the pleasure to submit the Report of the Chief Electoral Officer on the 2008 Electoral Boundary Redistribution. This report describes the activities Elections BC undertook to support the Electoral Boundaries Commission and to implement the electoral districts established in the 2008 *Electoral Districts Act*.

The first chapter includes an introduction to boundary redistributions in British Columbia. It explains what redistributions are and why they are necessary. It also defines electoral districts and voting areas, articulates the legal principles that underlie redistributions and provides an overview of the current redistribution model. The second chapter explores how technology and legislative change have affected how redistributions are conducted.

The third chapter is an account of the 2008 redistribution itself. It describes Elections BC's relationship with the Electoral Boundaries Commission and how Elections BC implemented the new electoral district boundaries ahead of the May 12, 2009 General Election and Referendum on Electoral Reform.

The fourth chapter analyses Elections BC's implementation activities by evaluating their impact on the 2009 election and referendum. It clarifies how the shortened timeline available for implementation work affected the redistribution, and demonstrates that digital descriptions of electoral district boundaries hold important benefits that justify their continued use.

The final chapter describes the expenses incurred by Elections BC. Appendices contain depictions of map products showing the new electoral district and voting area boundaries.

Respectfully submitted,

Harry Neufeld
Chief Electoral Officer

Table of contents

Redistribution timeline 8

Executive summary 9

Why boundaries change 10

The changing redistribution process 14

The development and implementation of new electoral district and voting area boundaries 17

The development phase 17

The implementation phase 29

Analysis and conclusion 40

Elections BC expenses 43

Appendices 45

Appendix A: Depiction of the provincial electoral district map (71 cm x 91.4 cm) . . . 46

Appendix B: Depiction of the selected areas map (71 cm x 91.4 cm) 47

Appendix C: Depiction of a Location Index map (North Coast electoral district, 21.6 cm x 28 cm) 48

Appendix D: Depiction of an ED/VA map (Kelowna-Lake Country electoral district, 61 cm x 91.4 cm) 49

Appendix E: Screen display of the electoral system comparison website application . 50

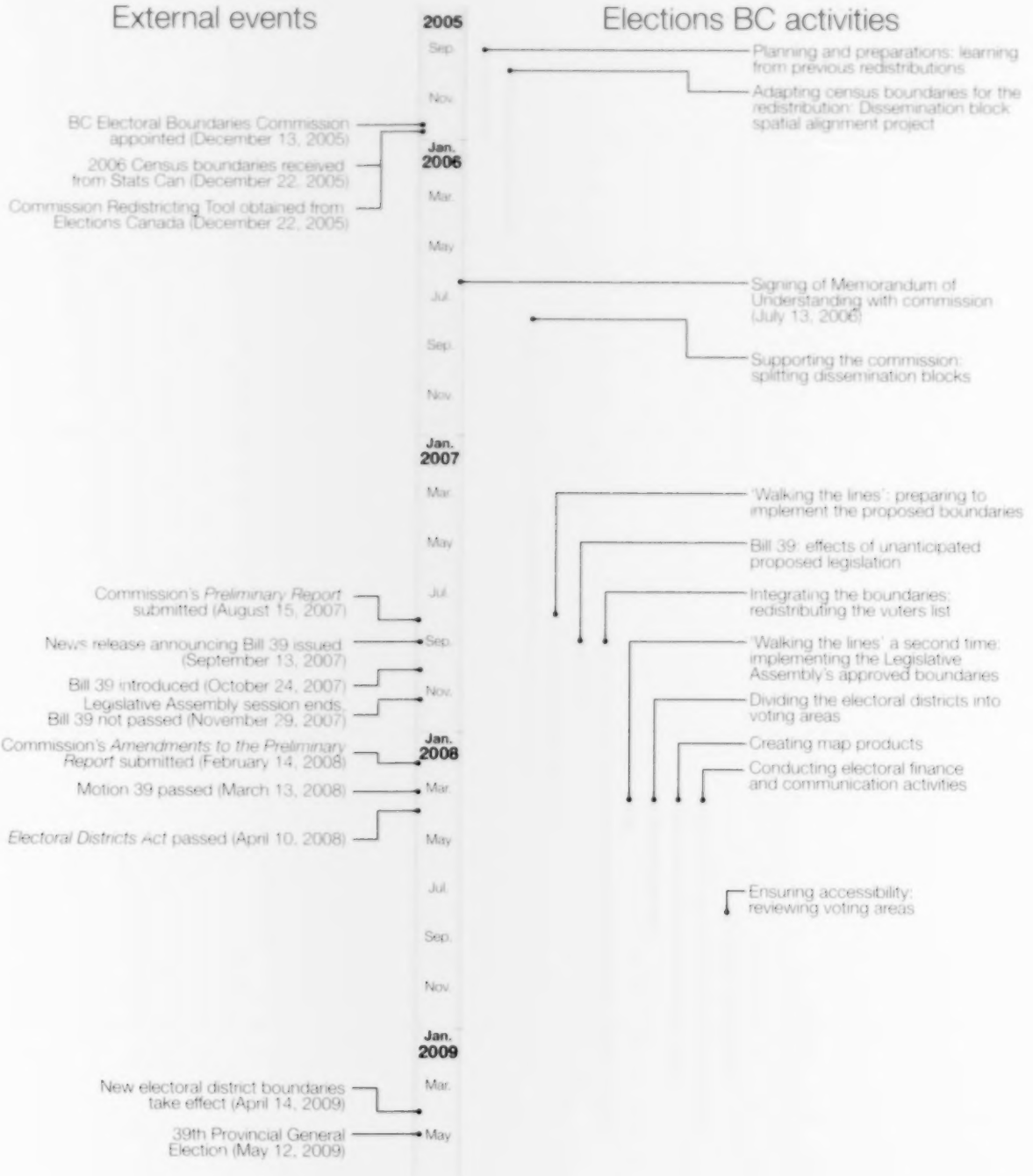
Appendix F: Screen display of the 2005 to 2008 voting area conversion table (Cariboo North electoral district) 51

List of figures and tables

Figure 1:	Redistribution timeline	8
Figure 2:	Vancouver-Fairview electoral district with voting areas	12
Figure 3:	Screen display of Elections BC base map in INDEA	18
Figure 4:	Screen display of the CRT	19
Figure 5:	Automated portion of the alignment project	21
Figure 6:	Manual review portion of the alignment project	22
Figure 7:	'Walking the lines' discrepancy	25
Figure 8:	Amendments to the Preliminary Report	27
Figure 9:	Provincial electoral district map showing selected areas	33
Figure 10:	North Coast electoral district Location Index map	34
Figure 11:	Voting areas in the Kelowna-Lake Country ED/VA map	34
Figure 12:	Electoral system comparison map	36
Table 1:	Evolving redistribution technology	14
Table 2:	Selected map products and related data created for the 2008 redistribution	32
Table 3:	Selected data from the 2009 Elections BC Voter/Non-Voter Satisfaction Survey	40

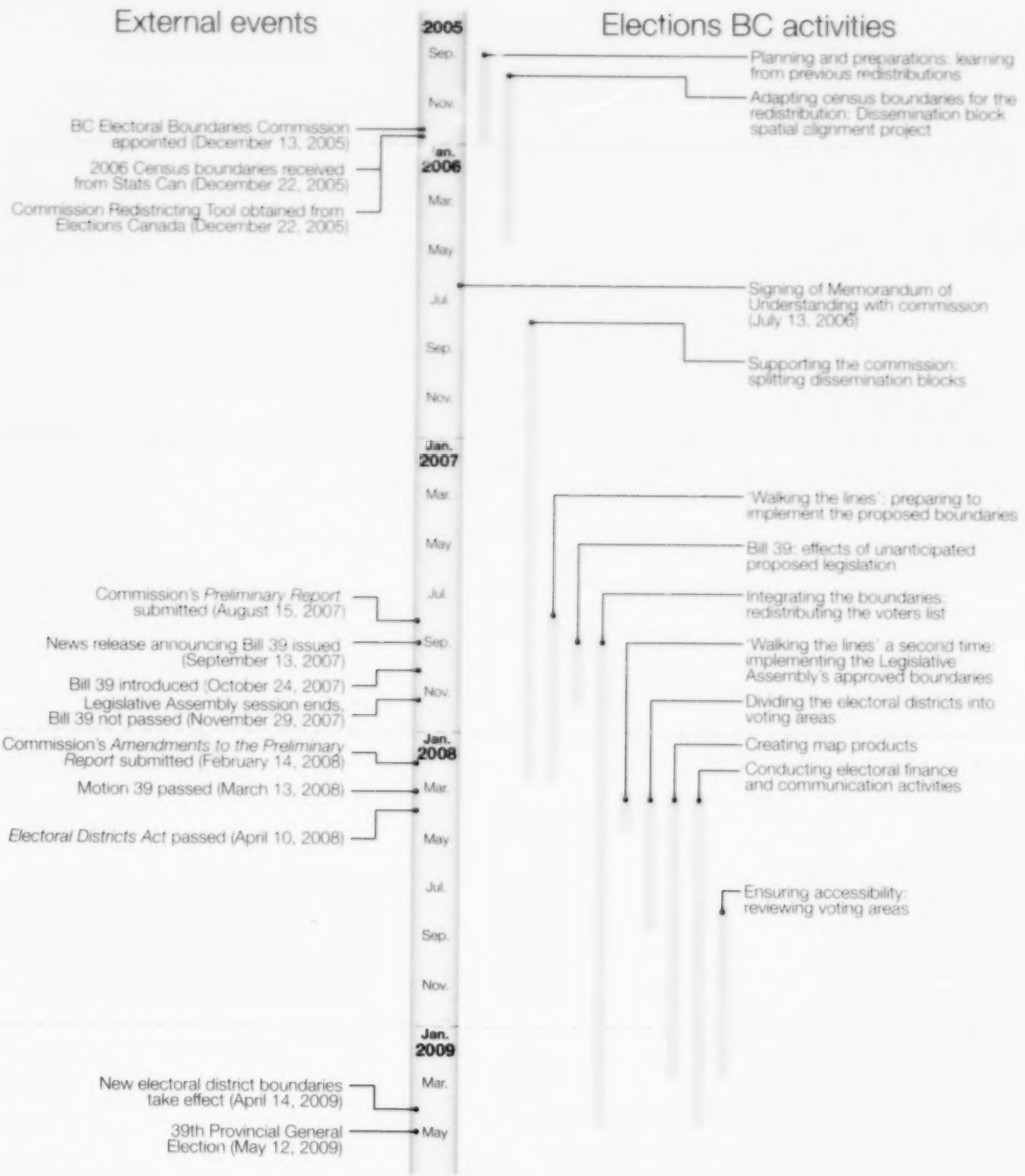
Redistribution timeline

Figure 1: Redistribution timeline


External events
Elections BC activities
2005
Sep.
Nov.
Jan. 2006
Mar.
May
Jul.
Sep.
Nov.
Jan. 2007
Mar.
May
Jul.
Sep.
Nov.
Jan. 2008
Mar.
May
Jul.
Sep.
Nov.
Jan. 2009
Mar.
May
Planning and preparations: learning from previous redistributions
Adapting census boundaries for the redistribution: Dissemination block spatial alignment project
BC Electoral Boundaries Commission appointed (December 13, 2005)
2006 Census boundaries received from Stats Can (December 22, 2005)
Commission Redistricting Tool obtained from Elections Canada (December 22, 2005)
Signing of Memorandum of Understanding with commission (July 13, 2006)
Supporting the commission: splitting dissemination blocks
'Walking the lines': preparing to implement the proposed boundaries
Bill 39: effects of unanticipated proposed legislation
Integrating the boundaries: redistributing the voters list
Commission's Preliminary Report submitted (August 15, 2007)
News release announcing Bill 39 issued (September 13, 2007)
Bill 39 introduced (October 24, 2007)
Legislative Assembly session ends, Bill 39 not passed (November 29, 2007)
'Walking the lines' a second time: implementing the Legislative Assembly's approved boundaries
Dividing the electoral districts into voting areas
Creating map products
Conducting electoral finance and communication activities
Commission's Amendments to the Preliminary Report submitted (February 14, 2008)
Motion 39 passed (March 13, 2008)
Electoral Districts Act passed (April 10, 2008)
Ensuring accessibility: reviewing voting areas
New electoral district boundaries take effect (April 14, 2009)
39th Provincial General Election (May 12, 2009)

Redistribution timeline

Figure 1: Redistribution timeline


External events
Elections BC activities
2005
Sep.
Nov.
Jan. 2006
Mar.
May
Jul.
Sep.
Nov.
Jan. 2007
Mar.
May
Jul.
Sep.
Nov.
Jan. 2008
Mar.
May
Jul.
Sep.
Nov.
Jan. 2009
Mar.
May
BC Electoral Boundaries Commission appointed (December 13, 2005)
2006 Census boundaries received from Stats Can (December 22, 2005)
Commission Redistricting Tool obtained from Elections Canada (December 22, 2005)
Commission's Preliminary Report submitted (August 15, 2007)
News release announcing Bill 39 issued (September 13, 2007)
Bill 39 introduced (October 24, 2007)
Legislative Assembly session ends, Bill 39 not passed (November 29, 2007)
Commission's Amendments to the Preliminary Report submitted (February 14, 2008)
Motion 39 passed (March 13, 2008)
Electoral Districts Act passed (April 10, 2008)
New electoral district boundaries take effect (April 14, 2009)
39th Provincial General Election (May 12, 2009)
Planning and preparations: learning from previous redistributions
Adapting census boundaries for the redistribution: Dissemination block spatial alignment project
Signing of Memorandum of Understanding with commission (July 13, 2006)
Supporting the commission: splitting dissemination blocks
'Walking the lines': preparing to implement the proposed boundaries
Bill 39: effects of unanticipated proposed legislation
Integrating the boundaries: redistributing the voters list
'Walking the lines' a second time: implementing the Legislative Assembly's approved boundaries
Dividing the electoral districts into voting areas
Creating map products
Conducting electoral finance and communication activities
Ensuring accessibility: reviewing voting areas

Executive summary

Electoral district boundary redistributions occur in British Columbia after every second general election. Their purpose is to achieve effective representation by adjusting the boundaries of provincial electoral districts to account for population changes.

Typically spanning three years in duration, redistributions begin with the formation of an Electoral Boundaries Commission to make proposals as to the area, names and boundaries of the province's electoral districts. The commission consults with the public and submits its proposals to the Legislative Assembly. Once a set of boundaries are passed into law, Elections BC implements the new electoral districts in time for the next scheduled general election.

As the Chief Electoral Officer is, by law, a member of a boundaries commission, it is common practice that Elections BC provide support to a commission. Elections BC's involvement in a redistribution thus spans the entire length of the event.

Elections BC initiated preparations for the 2008 redistribution in late 2005, prior to the appointment of the most recent commission. After its appointment, Elections BC provided the commission with population data and boundary delineation software. The commission was also provided access to Elections BC's geographic data, or base map, on which to map its proposals.

The commission submitted its final proposals in February 2008. In April 2008, the Legislative Assembly passed the *Electoral Districts Act*. After more than two years of support for the commission and preparatory activities, Elections BC began implementing the redistribution.

Elections BC divided the electoral districts into over 10,000 voting areas, redistributed the provincial voters list, created maps of the new boundaries and supported the de-registration and registration of constituency associations. Implementation activities concluded on April 14, 2009, when the writs of election were issued for the May 12, 2009 General Election and the new electoral districts took effect.

The 2008 redistribution was unique in a number of ways. The timeline for implementing the redistribution was condensed due to the extended deadline provided to the commission for submitting its proposals, unexpected events and other external factors. To meet critical event milestones, Elections BC found it necessary to limit the scope of some activities, as well as reduce opportunities for review and input on voting area boundaries and maps. These challenges highlight the complexity of the redistribution process.

The submission of digital descriptions of the new electoral districts also raised new issues, although their continued use is recommended. Digital files are more cost-effective than written descriptions, and improve the efficiency and clarity of a redistribution.

Despite these issues, the implementation of the boundaries in the *Electoral Districts Act* occurred on schedule. At a cost of $2,430,531, Elections BC's redistribution activities facilitated the successful administration of the May 12, 2009 General Election.

Why boundaries change

Effective representation

Our democracy is a representative one. At provincial elections, British Columbians choose Members of the Legislative Assembly (MLAs) to speak and make laws on their behalf. Each MLA is charged with representing the residents of a given geographic area called an electoral district. MLAs are entrusted to act in the interests of their constituents, and are held accountable at subsequent elections if they do not.

Section 3 of the *Charter of Rights and Freedoms* guarantees the right of all Canadians to vote. Importantly, since the Charter was signed into law in 1982, the Supreme Court of Canada has ruled that the right to vote extends beyond the right to simply cast a ballot. It guarantees the right of every Canadian to receive "effective representation."

Effective representation is a complex idea. It requires, in part, that our electoral map achieve a balance between the principle of voting equality (also called representation by population) and factors like geography, demographics and history. Every vote must have approximately the same value, and representation must reflect local community interests.

When representation is based on arbitrary or disparate groups, its effectiveness is diminished. In 1991, the Supreme Court stated conclusively that in order for effective representation to exist, factors like "geography, community history, community interests and minority representation," as well as "relative parity of voting power," must be considered.

Redistributions

A redistribution is the periodic review and adjustment of the province's electoral boundaries. Redistributions are needed to maintain effective representation in the Legislative Assembly as British Columbia's population grows and its communities evolve.

Over time, electoral district populations tend to drift apart, resulting in variations in the value of a vote across the province. One vote in a heavily populated electoral district can have less influence than one in a sparsely populated electoral district, because more votes are needed to elect an MLA in the former than in the latter. Effective representation is risked when population differences become so exaggerated that the value of some votes are unfairly diluted as compared to others.

In British Columbia, electoral district redistributions take place after every second provincial general election in accordance with the *Electoral Boundaries Commission Act*. They can be thought of as having two distinct phases. The first is a development phase, in which an independent Electoral Boundaries Commission is formed to consult with the public and make proposals as to the area, names and boundaries of the province's electoral districts. The second consists of implementing the new boundaries passed into law.

Under the *Electoral Boundaries Commission Act*, the commission must consist of a judge or a retired judge of the B.C. Supreme Court or the B.C. Court of Appeal, the Chief Electoral Officer and a person who is not an MLA or a government employee, nominated by the

Speaker of the Legislative Assembly after consultation with the Premier and the Leader of the Official Opposition.

The Act specifies the maximum number of electoral districts that the commission may propose. It also requires the commission to propose electoral districts that achieve the principle of representation by population while recognizing "countervailing factors" like geography, demographics, history and community interests. The population of each proposed electoral district must be within plus or minus 25% of the provincial average - the electoral quotient - except in cases where the commission deems very special circumstances exist.

In balancing these sometimes competing imperatives, the commission aims to give effect to constitutionally-guaranteed voting rights. As the most recent commission noted, "much of our energy has gone into proposing electoral boundaries that take into account geography, population, history and community interests with the intent that every British Columbian receive effective representation."

In its current form, the Act states that the commission must submit a report to the Speaker of the Legislative Assembly containing its preliminary proposals within 12 months of being appointed. The commission must then hold a round of public hearings to receive input from the public. The commission has an additional six months to consider the public's recommendations and, if it chooses, to amend its preliminary proposals by submitting a final report.

After considering the commission's report, the Legislative Assembly may reject, approve, or approve with alterations their proposed electoral districts. If approved or approved with alterations, the commission's proposals are introduced by government as a Bill, usually called the *Electoral Districts Act*. The new electoral districts come into effect at the next general election.

The second phase of a redistribution, the implementation phase, begins when the Bill is passed. Responsibility is transferred to Elections BC, which must ensure that the next general election can be administered under the new electoral district boundaries. Intervening by-elections and recall or initiative campaigns are conducted using the existing electoral district boundaries.

A complex and multi-stage process, the implementation phase involves creating maps and map products, supporting the deregistration and registration of constituency associations, updating Elections BC's computer applications, redistributing the voters list based on the new electoral districts and dividing the new electoral districts into voting areas.

Voting areas

Voting areas are geographic subdivisions of electoral districts and the administrative building blocks used to manage electoral events. Required by the *Election Act*, voting areas are used to assign voters to a ballot box at a voting place. Section 80 of the Act restricts the size of voting areas to 400 registered voters; the maximum number of voters for whom a pair of election officials at a voting station can reasonably administer voting to in a single day.

Figure 2: Vancouver-Fairview electoral district with voting areas

The Vancouver-Fairview electoral district with its voting area boundaries depicted with dotted red lines.

Establishing new voting area boundaries is a major part of an electoral district redistribution. Elections BC must divide each new electoral district into more than a hundred voting areas (over 10,000 were established for the 2008 redistribution). Voting area boundaries should reflect local knowledge, and allow for the assignment of voting places that are accessible and convenient for the voters resident in the voting area.

Voting area maintenance also occurs separately from electoral district redistributions. Like electoral districts, voting area populations do not remain static over time. As new roads and buildings are constructed, voting area populations may grow beyond the 400 registered voter limit. Conversely, they may become so small that the secrecy of the

Voting areas

Voting areas are geographic subdivisions of electoral districts and the administrative building blocks used to manage electoral events. Required by the *Election Act*, voting areas are used to assign voters to a ballot box at a voting place. Section 80 of the Act restricts the size of voting areas to 400 registered voters; the maximum number of voters for whom a pair of election officials at a voting station can reasonably administer voting to in a single day.

Figure 2: Vancouver-Fairview electoral district with voting areas

The Vancouver-Fairview electoral district with its voting area boundaries depicted with dotted red lines.

Establishing new voting area boundaries is a major part of an electoral district redistribution. Elections BC must divide each new electoral district into more than a hundred voting areas (over 10,000 were established for the 2008 redistribution). Voting area boundaries should reflect local knowledge, and allow for the assignment of voting places that are accessible and convenient for the voters resident in the voting area.

Voting area maintenance also occurs separately from electoral district redistributions. Like electoral districts, voting area populations do not remain static over time. As new roads and buildings are constructed, voting area populations may grow beyond the 400 registered voter limit. Conversely, they may become so small that the secrecy of the

vote is jeopardized. New topographical features can also affect accessibility within their boundaries. By reviewing and adjusting voting area boundaries, Elections BC is able to resolve issues of accessibility and population change.

The scope of voting area maintenance can vary, from segments of electoral districts to the entire province. Province-wide voting area redistributions entail significant work and considerable costs. Their staffing and technological requirements are comparable to those of an electoral district redistribution. New voting area maps must be produced and the voters list must be updated to ensure voters are linked to their correct voting area of residence.

Most voting area work, however, continues to occur in conjunction with electoral district redistributions. Under the current redistribution model, Elections BC conducts a full review of all of the province's voting areas when new electoral district boundaries are passed into law. Accordingly, the term "redistribution" in this report means the complete redistribution of both electoral district and voting area boundaries.

The changing redistribution process

Technological advances

Recent technological advances have had a significant impact on how redistributions are conducted. Until the late 1980s, new electoral district boundaries were drawn on paper maps with pen, ink and tape. Voting area boundaries were then determined using a mix of local knowledge, calculators and ad hoc reference maps from various government ministries and private sector sources. Maps showing the new electoral district and voting area boundaries were printed on mylar sheets using photographic processes involving negatives, masking and template sheets for subsequent reproduction onto paper.

Today, redistributions are done on computers with sophisticated geographic information system (GIS) software. For example, the most recent Electoral Boundaries Commission (referred to as the Cohen Commission, after its Chair) had access to a customized GIS application that combines detailed census information with spatial data.

Using the application, the commission could map an electoral district and have its population and deviation from the electoral quotient displayed instantaneously. Other software allowed the commission to superimpose its electoral district boundaries over satellite imagery of the province, allowing it to examine the practical implications of its proposals.

During the implementation phase of the 2008 redistribution, Elections BC used a semi-automated software tool to generate voting area boundaries, before manually reviewing and resolving any issues. Advanced mapping software was used to prepare and print high quality electoral district and voting area maps for the public, as well as for registered political parties, candidates and other clients.

Table 1: Evolving redistribution technology

Year	Electoral districts	Voting areas	Voting area maps	Boundary delineation method	Map production method	Technology used
1984	52	5,547	208	Manual	Manual	Pen, paper maps, calculators, photographic reproduction techniques
1988	75	6,305	395	Manual	Digital	Pen, paper maps, calculators, Microstation CAD software
1999	79	8,212	361	Digital	Digital	Paper and digital maps, INDEA, AtlasGIS, ArcMAP, ArcView 3.1, ArcGIS 8.0
2008	85	10,184	469	Digital	Digital	INDEA, Commission Redistricting Tool (based on ArcView 3.2a), Google Earth, ArcGIS 9.2

Digital boundary descriptions

The 2008 redistribution also saw the discontinuation of written legal descriptions of electoral district boundaries. In past redistributions, it was standard for Electoral Boundaries Commission reports and the *Electoral Districts Act* to delineate electoral district boundaries in the form of "metes and bounds" descriptions.

Metes and bounds are a detailed method of defining the limits of a parcel of land. They are prepared by professional surveyors and can be cryptic to the average reader. In the report of the 1999 Electoral Boundaries Commission (the Wood Commission), for example, the description of the proposed Abbotsford-Clayburn electoral district began with:

> "Consisting of that part of the City of Abbotsford described as follows: commencing at the intersection of the northerly prolongation of Gladwin Road and the Fraser River; thence southerly along said northerly prolongation and along Gladwin Road to Highway 1; thence westerly along Highway 1 to Clearbrook Road; ..."

The Cohen Commission chose to forego metes and bounds and submitted their proposed boundaries digitally. A DVD packaged with the commission's final report contained their proposed electoral districts saved as shapefiles, a data format common to GIS software. The DVD included software allowing users to view the electoral district boundaries in the context of geographic features and local administrative boundaries. Together with the printed maps available in their reports, the commission felt satisfied that "the traditional metes and bounds descriptions of proposed electoral boundaries [had become] unnecessary."

In establishing the new electoral districts in the *Electoral Districts Act*, the Legislative Assembly referenced the digital files rather than including metes and bounds descriptions in the Schedule to the Act. By doing so, the Legislative Assembly established the digital files as the legal source of the new boundaries.

The effect of technology

The net effect of these innovations is to improve the quality and precision of the redistribution process. Advanced computer software supported by high quality census data facilitates the creation of effective electoral district and voting area boundaries, and enables the production of accurate maps and map products. Technology can also lower costs by reducing staffing requirements.

Technology does not, however, shorten the redistribution timeline. It merely automates the onerous tasks of drawing lines and calculating populations. The critical redistribution activities, such as determining the location of electoral district and voting area boundaries, receiving local input on those decisions and reviewing the quality of map products, remain labour-intensive and time-consuming.

Additionally, technology often generates its own challenges. The 2008 redistribution, for example, required Elections BC to modify its Online Voter Registration and Know Your

Electoral District website applications and import the new electoral district and voting area boundaries into the Electoral Information System (EIS), the core database system used to support the administration of provincial electoral events. These activities, described in the following chapters, were foreign to past redistributions, and are the unavoidable corollary of otherwise beneficial technological advances.

Legislative change

Changes to legislation have also affected how redistributions are conducted. In 1995, a new *Election Act* was passed, establishing Elections BC as an independent, non-partisan Office of the Legislature and introducing substantial changes to the provincial electoral process. The Act included a provision allowing registered political parties and independent MLAs to register constituency associations for future electoral districts. Because constituency associations are automatically deregistered when their associated electoral districts are disestablished, this provision allows political parties and independent incumbents to avoid the inconvenience of registering constituency associations for new electoral districts during a campaign period.

Further legislative changes occurred during the 1999 redistribution, when passage of the *Electoral Districts Act* prompted consequential amendments to the *Election Act* to ease the transition to new electoral districts. The amendments allowed for District Electoral Officers (DEOs) - the officials who administer elections in each electoral district - to be appointed to future electoral districts. This has improved the effectiveness of Elections BC's training and event preparation activities.

The 1999 amendments also allowed for standing nominations to be accepted for future electoral districts, and removed the requirement for constituency associations that were automatically deregistered to submit an audited financial report.

Together, these legislative changes have improved the efficiency of the redistribution process. They have reduced the administrative burden on Elections BC, and made planning for campaigns under new electoral districts easier for candidates and political parties.

The development and implementation of new electoral district and voting area boundaries

The development phase

Commission appointment and mandate

December 2005

The 2008 redistribution began with the appointment of the Cohen Commission on December 13, 2005. In addition to its Chair, the Honourable Mr. Justice Bruce Cohen, and Harry Neufeld, the Chief Electoral Officer (CEO), the commission initially included Louise Burgart. Following her resignation in February 2006, Stewart Ladyman, a retired school district administrator, was appointed to the commission in March. The appointment of all three commissioners was validated in the *Attorney General Statutes Amendment Act, 2006*, passed on March 30, 2006. Validation was necessary because the original commissioners were appointed after the November 30, 2005 deadline set by the *Electoral Boundaries Commission Act*.

The commission derived its mandate from the *Electoral Boundaries Commission Act* as amended by the *Electoral Boundaries Commission Amendment Act, 2005*. The second Act expanded the commission's traditional scope by directing it to propose two sets of boundaries; one for electoral districts for the existing first-past-the-post electoral system, and a second set for the B.C. Single Transferable Vote (BC-STV) electoral system proposed by the Citizens' Assembly on Electoral Reform. The BC-STV boundaries were intended to give British Columbians voting in the May 12, 2009 Referendum on Electoral Reform a better understanding of how electoral districts would be configured if the new electoral system was approved.

Given its expanded responsibilities, and to allow it to incorporate the results of the 2006 Census, the Legislative Assembly set a deadline of 20 months for the commission to submit its preliminary report, an increase over the 12 months traditionally granted to past commissions.

Planning and preparations: learning from previous redistributions

August 2005 - December 2005

As the CEO is automatically a member of an Electoral Boundaries Commission, it is common practice that Elections BC assists a commission for the duration of its work. This includes initial assistance in the areas of financial administration, facilities and technology, and ongoing assistance through the provision of geographic and population data. Despite this arrangement, the commission and Elections BC remain separate organizations.

To ensure its readiness to support the Cohen Commission (and, later, to implement new electoral district boundaries), Elections BC undertook a comprehensive schedule of preparatory activities shortly after the 2005 General Election. The timing of these activities was predicated on the November 2005 deadline for appointing the commission.

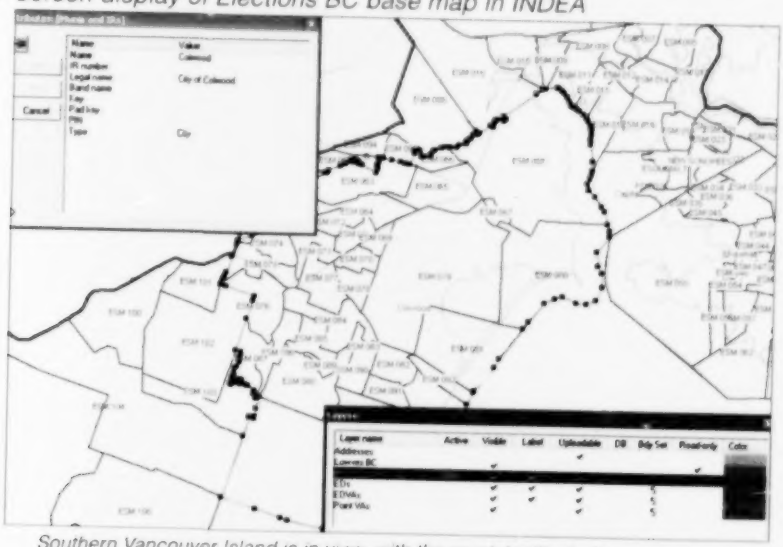
Among Elections BC's initial preparations was a review of the work plans and timelines of

the 1999 redistribution. It was recognized that advances in technology had allowed the 1999 Wood Commission and Elections BC to pioneer new ways of producing electoral districts which had improved the efficiency of the provincial redistribution process. The Wood Commission's use of the Elections BC base map was particularly effective.

A base map is the basic, underlying layers of geographic data in a GIS. Base maps typically include spatial data such as hydrography (rivers, lakes, etc.), topography (mountains, valleys, buildings, etc.) and roads. Other data can be placed over a base map and analyzed, indexed and referenced.

The Elections BC base map is maintained in the Integrated Digital Electoral Atlas (INDEA), an internal GIS computer application. The INDEA base map comprises several layers of spatial data, including the provincial road network, municipalities, regional districts, Indian reserves, hydrography, railways, hydro lines, federal electoral districts and provincial electoral districts and voting areas.

Figure 3: Screen display of Elections BC base map in INDEA



Southern Vancouver Island is in view, with the municipality, Indian reserve, electoral district and voting area layers visible.

By providing the Wood Commission access to the INDEA base map, several benefits were realized. It allowed the commission to view its proposed electoral districts in relation to other geographic layers, such as roads, municipal boundaries and federal electoral districts. It eased the integration of the new electoral districts into Elections BC's computer systems, since staff could access digital files rather than having to interpret written metes and bounds descriptions. Using a common digital base map also facilitated data sharing between Elections BC and the Wood Commission, and promoted consistency by ensuring that the same geographic data was used at every stage of the redistribution; from mapping electoral districts to creating map products and establishing voting areas.

The use of technology in the 1999 redistribution represented an improvement over previous redistribution methods. For the 2008 redistribution, Elections BC strove to build on the successes of the 1999 redistribution by once again providing the commission access to the INDEA base map.

The Commission Redistricting Tool (CRT)

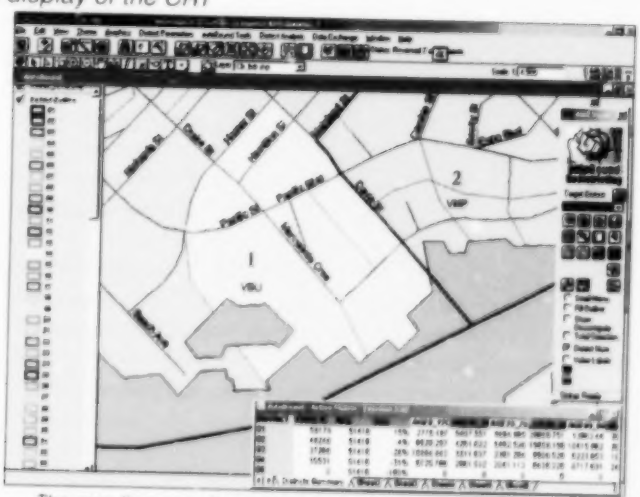
November 2005 - December 2005

To enhance the usefulness of the INDEA base map for the commission, Elections BC also sought out appropriate population data and boundary delineation software. It was recognized that furnishing the commission with these resources would enhance the accuracy and longevity of its proposed electoral districts, as well as eliminate the need to design a custom software application for its use.

To that end, Elections BC worked to gain access to the Commission Redistricting Tool (CRT), a computer application developed by Elections Canada for the 2001-2004 federal redistribution. Elections BC was uniquely positioned to negotiate for the CRT because of its existing partnership arrangements with Elections Canada. The CRT integrates electoral district boundaries with census data, allowing users to map new electoral districts by selecting and combining census dissemination blocks.

Dissemination blocks are the smallest geographic units for which Statistics Canada collects census information. They range in size from single city blocks in cities to large areas bounded by geographic features in remote regions. The number of dissemination blocks and their boundaries change at each national Census. For the 2006 Census, Statistics Canada used 478,831 dissemination blocks, 52,808 of which were in British Columbia.

Figure 4: Screen display of the CRT



The gray lines are dissemination block boundaries. The yellow area represents dissemination blocks that have been selected for removal from electoral district "1" and inclusion in electoral district "2".

The CRT was recommended as a useful tool for the commission's purposes because it automates an important but often tedious aspect of the redistribution process. By combining dissemination blocks to form new electoral districts, the CRT is able to immediately display population data from the underlying census information.

Previously, these calculations had been manual and time-consuming, forcing commissions to periodically halt their deliberations while statisticians and geographers tallied the populations of their latest boundary proposals. As the Chief Electoral Officer of Canada explained in the 2005 federal report, *Enhancing the Values of Redistribution*, the CRT

> "received high praise for transforming what had previously been a laborious exercise – involving a complicated array of maps, atlases and coloured pens – into a more seamless exercise of visualizing and exploring alternatives as they are put forward. For the first time, a proposed electoral boundary change could be mapped instantaneously, its population and deviance from the quotient calculated, and the impact of the changes on neighbouring ridings assessed – and all at the same time."

2006 Census boundaries

November 2005 - December 2005

Like all GIS software, the CRT is only as effective as the data beneath it. To obtain the latest dissemination block data, Elections BC contacted Statistics Canada in late 2005. Negotiations with the federal agency culminated in a Letter of Agreement, signed December 22, 2005, in which Statistics Canada agreed to provide access to the boundaries of the 2006 dissemination blocks prior to their public release.

The dissemination blocks' component population data, however, was not available because Census preparations were still in progress. Elections BC thus received the location of each dissemination block, but not the number of people each contained.

To populate the empty dissemination blocks, Elections BC contracted BC Stats to generate population estimates based on 2001 Census data. The Electoral Boundaries Commission used these population estimates as proxy data until the actual 2006 Census figures were released in March 2007. The final numbers were then inserted into the CRT, and the commission's proposed electoral districts were reviewed and adjusted as necessary.

Receiving the dissemination block boundaries a year early was critical. It allowed the commission to begin proposing electoral districts on geographic units that would, within several months, contain the highest quality population data available. BC Stats' population estimates also proved extremely accurate, varying from the final Census figures by less than 0.5% across the province and necessitating relatively few changes to the commission's electoral districts.

Adapting census boundaries for the redistribution: dissemination block spatial alignment project

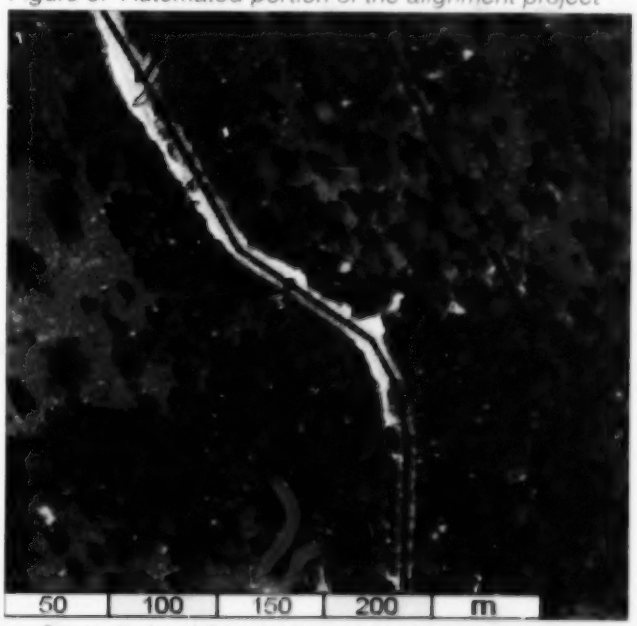
November 2005 - April 2006

To adapt them for mapping provincial electoral districts, the dissemination blocks had to be aligned to synchronize with the INDEA base map. Ordinarily, dissemination blocks are referenced to a federal base map used by Elections Canada and Statistics Canada. The federal map base and the INDEA base map are representationally consistent - they agree that certain features exist - but often positionally inconsistent - they sometimes disagree about precisely where those features are located.

Positional inconsistencies hold important implications for redistributions. A dissemination block aligned to the centre of the road on the federal base map, for example, may run through an apartment building adjacent to the road on the INDEA base map. Without aligning the dissemination blocks to the Elections BC base map, the basic units for forming electoral districts would have appeared arbitrary, lacking any connection to the other spatial data in INDEA.

In January 2006, Elections BC initiated the dissemination block spatial alignment project. The project involved Statistics Canada, Elections Canada, Elections BC, Base Mapping and Geographic Services (now the Crown Registry and Geographic Base Branch) and an independent contractor, Refractions Research.

Figure 5: Automated portion of the alignment project



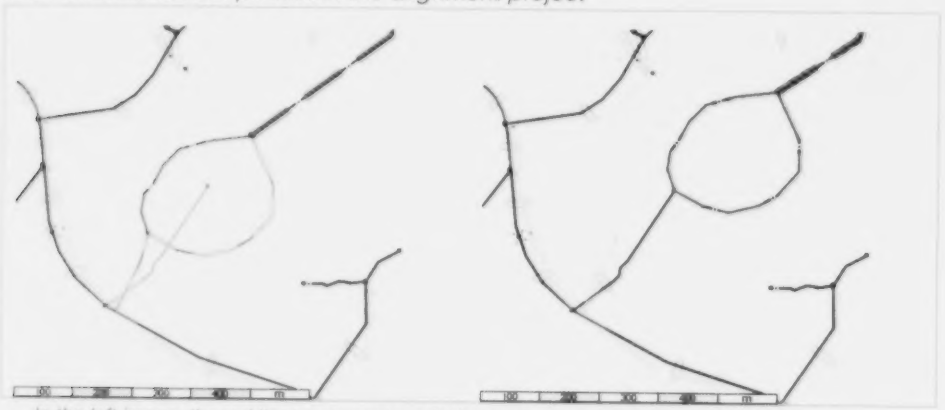
Screen display of the automated portion of the alignment project. The blue line is a road used as a dissemination block boundary that has been adjusted to match its location in INDEA (the green highlighted line).

Because most census dissemination blocks follow roads, the spatial alignment project sought specifically to match the dissemination blocks to the provincial road network, one of the base map layers in INDEA. In January 2006, Elections BC provided Refractions Research with a digital file of the provincial road network, as well as the dissemination block boundaries provided by Statistics Canada. Refractions Research used an automated process to lay the dissemination block boundaries over the road network. Where there were positional discrepancies between the two data sets, the affected dissemination block boundaries were

moved to match the appropriate roads.

The automated portion of the spatial alignment project occurred in January and February 2006. A manual review was conducted in March and April 2006 to address instances where the automated process was unable to resolve discrepancies. Cul-de-sacs, for example, proved especially difficult for the software to reconcile. During this portion of the project, GIS technicians determined the road a dissemination block boundary should follow, and aligned it appropriately.

Figure 6: Manual review portion of the alignment project



In the left image, the red lines represent roads that were not aligned successfully. The right image shows their successful alignment (the green highlighted lines) after review and adjustment by a GIS technician.

By the end of April 2006, the dissemination block boundaries were fully aligned to the INDEA road network file provided in January. As the actual road network had not remained static during that time, additional work was needed to update the aligned data to reflect the changes that had occurred in the intervening months.

Memorandum of Understanding

July 2006

Following its appointment, the Cohen Commission spent several months hiring administrative staff, locating office space and installing computer systems. To formalize its access to the geographic and population data and software tools, the commission signed a Memorandum of Understanding (MOU) with Elections BC in July 2006.

The MOU established that Elections BC would provide the commission with the CRT, loaded with the INDEA base map data, the spatially aligned 2006 dissemination blocks and the BC Stats population estimates. Because the licensing agreement with Elections Canada restricted access to the CRT to Elections BC staff, the MOU also included the provision of Elections BC GIS technicians to work at the commission's Vancouver office. These staff, a Production Manager and two Technical Analysts, were hired in the fall of 2006. Their

salaries and other associated costs were drawn from Elections BC's redistribution event budget and later reimbursed by the commission.

Under the deliverables of the MOU, the GIS technicians operated the CRT to map iterations of the commission's proposed electoral district boundaries. By introducing Google Earth as a complement to the CRT, the GIS technicians allowed the commission to view its boundary iterations over satellite imagery of the province. Doing so gave the commission an appreciation for the "on the ground" implications of its evolving boundary proposals.

In addition to mapping electoral district boundaries, the GIS technicians performed demographic analyses as necessary, and prepared digital and printed map products.

The working partnership between Elections BC and the Electoral Boundaries Commission, initiated in late 2005 and formalized in the MOU, had important benefits for both organizations. For the commission, it provided the latest GIS software and census data, as well as immediate and economical access to Elections BC's GIS expertise and base map information. For Elections BC, it offered an understanding of the commission's methods and eventual products. Further benefits were realized later in the process, when the commission's use of the INDEA base map eased the integration of the final legislated electoral district boundaries into Elections BC's computer systems.

Supporting the commission: splitting dissemination blocks

August 2006 - February 2008

The commission started its review and development of proposed electoral district boundaries in August 2006. From September to December, it held 34 public consultation sessions across the province to gain an understanding of local community interests. As the commission explained in its *Preliminary Report*, "[w]e were convinced we would learn a great deal about what works by visiting local communities and talking to residents and MLAs."

The commission used the public input it received to explore various boundary configurations using the CRT. During this process, the commission encountered instances where it was unable to draw a desired boundary because corresponding dissemination blocks were configured with different boundaries. At other times, the commission found dissemination blocks that strayed from what appeared to be their intended geographic bases, diverging conspicuously from prominent features such as heights of lands, roads, lakes, etc.

When either discrepancy was encountered, the Vancouver-based GIS staff sent a request to Elections BC headquarters for the affected dissemination blocks to be redrawn to follow the commission's desired path, a process known as dissemination block "splitting."

Over the course of the commission's work, Elections BC performed between 70 and 80 dissemination block splits. A typical batch of ten split requests required two to three days,

causing delays for the commission and diverting resources at Elections BC. The process required a GIS technician to manually alter the affected dissemination blocks in INDEA, a task of varying difficulty depending on the complexity of the commission's requested path. Updated population projections were then prepared, attached to the revised dissemination blocks and returned to the commission (the updated population projections were also sent to BC Stats, which verified the data for its own use).

Splitting census dissemination blocks was an unanticipated and time-consuming activity, yet it allowed the commission greater flexibility in accommodating local community interests - a key element of effective representation.

The commission's *Preliminary Report*

August 2007
After approximately a year of public consultation and electoral district boundary development, the Electoral Boundaries Commission submitted its *Preliminary Report* on August 15, 2007. The report proposed 81 electoral districts, up from the existing 79. It recommended that there be one less electoral district in each of three predominantly rural North, Cariboo-Thompson and Columbia-Kootenay regions, and one additional electoral district in each of five mostly urban Burnaby and New Westminster, Fraser Valley, Surrey, Tri-Cities and Vancouver regions. The report also proposed 20 BC-STV electoral districts based on combinations of proposed first-past-the-post electoral districts.

Following the report's public release, the Vancouver-based GIS technicians sent Elections BC a file containing the proposed electoral district boundaries in digital form.

On September 5, 2007, the commission held the first in a series of public hearings to receive input on its proposed boundaries. The commission's final report, containing any amendments it chose to make to its preliminary proposals, was due by February 15, 2008.

The commission's proposed reduction of three rural electoral districts was greeted negatively by many residents of those regions. The commission's first public hearing following the release of the *Preliminary Report*, in Prince George, was preceded by a rally of local citizens who supported retaining the number of existing electoral districts in the North and elsewhere.

'Walking the lines': preparing to implement the proposed boundaries

August 2007 - September 2007
In preparing for the redistribution, Elections BC had assumed that the commission's final report would contain only minor adjustments to its preliminary report. This assumption was based on previous commissions, whose final reports consisted mostly of small changes to their proposals to better reflect local concerns.

Consequently, Elections BC treated the Cohen Commission's preliminary report as an accurate indication of the electoral districts it would later have to implement. Confident that

there would be few changes, Elections BC took the first steps towards implementing the proposed electoral districts by integrating them into INDEA and, later, dividing them into voting areas.

Figure 7: 'Walking the lines' discrepancy

Screen display of a discrepancy identified during the electoral district alignment, or 'walking the lines,' process.

The condensed timeline for implementing the redistribution offered further justification for starting the electoral district integration and voting area creation work as soon as possible. The additional eight months allotted the commission meant less time for Elections BC to implement the new electoral districts before they would come into effect for the 2009 General Election. In the past, Elections BC had 20 months to ensure its readiness to conduct electoral events under new electoral districts; for the 2008 redistribution it had less than a year.

On August 16, 2006, Elections BC began integrating the 81 proposed electoral districts into INDEA. Called 'walking the lines,' the integration process ensured the alignment of the electoral district boundaries to the INDEA base map. Because the dissemination block spatial alignment project had focussed exclusively on the road network, dissemination blocks that followed other geographic features had to be manually aligned to the other layers of spatial data in INDEA. The electoral district boundaries also had to respect recent base map updates, such as new roads or subdivisions, that had occurred since the commission began its work. GIS technicians reviewed the commission's proposals at a granular level, visually tracing each boundary to identify and resolve discrepancies.

Walking the lines offered benefits for the commission, as well. By carefully reviewing each of its proposed boundaries, Elections BC was able to identify mistakes and oversights, such as small pockets of residents inadvertently cut off from their home communities and Indian reserves that were mistakenly divided.

Bill 39: the effects of unanticipated proposed legislation

September 2007 - November 2007

On September 13, 2007, Premier Gordon Campbell issued a news release revealing the government's plan to introduce legislation giving the commission the legal tools to protect rural representation. The legislation would, according to the news release, require the commission to maintain the existing number of electoral districts in the North, Cariboo-Thompson and Columbia-Kootenay regions while adding eight electoral districts in the more densely populated regions.

In response, the commission cancelled its remaining public hearings. Considering the potential implications of the announcement – the new mandate would have required the commission to amend most of its proposed electoral district boundaries – the commission chose initially to await further legislative details before proceeding.

Elections BC, however, decided not to halt the integration of the commission's preliminary boundary proposals into INDEA. Instead, it was decided that discrepancies between the 81 proposed electoral districts and the final electoral districts – whatever their configuration – would be resolved at a later stage.

Bill 39, the *Electoral Boundaries Commission Amendment Act, 2007*, was introduced on October 24, 2007. As announced in the Premier's news release, the Bill set the number of electoral districts the commission had to propose at 87, and required that the existing number of electoral districts in the three rural regions be preserved.

In anticipation that Bill 39 would be enacted, the commission began preparing scenarios to meet the new requirements. It mapped scenarios that retained the existing number of electoral districts in the North, Cariboo-Thompson and Columbia-Kootenay regions while adhering as closely as possible to the principle of representation by population.

By November 2007, Bill 39 had advanced to second reading in the Legislative Assembly. On November 28, with the close of the parliamentary session approaching, the government confirmed that it would not invoke closure to force passage of the legislation. Bill 39 was not passed when the third session of the 38th Parliament ended on November 29, 2007.

As a result, the commission retained its original mandate and resumed its public hearings, while Elections BC continued with the electoral district integration and voting area creation work for the 81 electoral districts in the *Preliminary Report*.

The commission's *Amendments to the Preliminary Report*

February 2008

The commission submitted its final report, entitled *Amendments to the Preliminary Report*, on February 14, 2008. It contained proposals for 83 electoral districts. The commission continued to propose that two rural regions, the North and the Cariboo-Thompson, have one less electoral district each. However, it also proposed that the number of electoral districts in the Columbia-Kootenay region stay at four and that the number of new electoral districts in urban regions be increased to six. Its proposal for 20 BC-STV electoral districts remained unchanged, although their boundaries and district magnitudes were adjusted to reflect changes to their component first-past-the-post electoral districts.

Figure 8: Amendments to the Preliminary Report

Cover of the Electoral Boundaries Commission's Amendments to the Preliminary Report, submitted February 14, 2008.

In an appendix to the report, the commission included the Bill 39 scenarios it had prepared in October and November 2007 for rural areas. While clearly stating that the scenarios were not proposals, the commission noted that if the Legislative Assembly "decides to alter our proposals by restoring the number of current electoral districts in the North and Cariboo-Thompson regions, for a total of 85 electoral districts, then these scenarios may provide assistance to the legislature when drawing the boundaries for these two regions."

Following submission of the report, Elections BC stopped work on the 81 electoral districts and began alignment and voting area creation work for the 83 electoral districts. In some regions, there were relatively few differences between the commission's preliminary proposals and their final proposals, reducing the necessary alignment work and allowing for many of the voting areas created for the 81 electoral districts to be used for the 83 electoral districts. In regions where the commission had made substantial amendments to their original proposals - the Columbia-Kootenay region, for example - Elections BC had to revise much of its earlier work.

Cognizant of the government's commitment to maintaining rural representation, Elections BC also launched a review of the existing electoral districts to ensure their readiness should the commission's proposals be rejected and the 79 existing electoral districts retained.

The commission's *Amendments to the Preliminary Report*

February 2008

The commission submitted its final report, entitled *Amendments to the Preliminary Report*, on February 14, 2008. It contained proposals for 83 electoral districts. The commission continued to propose that two rural regions, the North and the Cariboo-Thompson, have one less electoral district each. However, it also proposed that the number of electoral districts in the Columbia-Kootenay region stay at four and that the number of new electoral districts in urban regions be increased to six. Its proposal for 20 BC-STV electoral districts remained unchanged, although their boundaries and district magnitudes were adjusted to reflect changes to their component first-past-the-post electoral districts.

Figure 8: Amendments to the Preliminary Report

Cover of the Electoral Boundaries Commission's Amendments to the Preliminary Report, submitted February 14, 2008.

In an appendix to the report, the commission included the Bill 39 scenarios it had prepared in October and November 2007 for rural areas. While clearly stating that the scenarios were not proposals, the commission noted that if the Legislative Assembly "decides to alter our proposals by restoring the number of current electoral districts in the North and Cariboo-Thompson regions, for a total of 85 electoral districts, then these scenarios may provide assistance to the legislature when drawing the boundaries for these two regions."

Following submission of the report, Elections BC stopped work on the 81 electoral districts and began alignment and voting area creation work for the 83 electoral districts. In some regions, there were relatively few differences between the commission's preliminary proposals and their final proposals, reducing the necessary alignment work and allowing for many of the voting areas created for the 81 electoral districts to be used for the 83 electoral districts. In regions where the commission had made substantial amendments to their original proposals - the Columbia-Kootenay region, for example - Elections BC had to revise much of its earlier work.

Cognizant of the government's commitment to maintaining rural representation, Elections BC also launched a review of the existing electoral districts to ensure their readiness should the commission's proposals be rejected and the 79 existing electoral districts retained.

The enactment of new boundaries

March 2008 - May 2008

After considering the commission's proposals, the government introduced Motion 39 on March 13, 2008. The motion approved the commission's proposals with alterations. It accepted the proposed boundaries in every region except for the North and the Cariboo-Thompson, where it called for implementation of the commission's Bill 39 scenarios for a total of 85 electoral districts. The motion was approved unanimously.

To give effect to the motion, the government introduced Bill 19, the *Electoral Districts Act*, on April 7, 2008. Bill 19 defined the boundaries of the new electoral districts as agreed to in Motion 39, and set Writ Day for the next general election (scheduled for April 14, 2008) as the date they would come into force. Importantly, neither Motion 39 nor Bill 19 addressed the commission's proposed BC-STV boundaries.

Bill 19 was passed by the Legislative Assembly on April 10, 2008 and received Royal Assent on May 1, 2008. At that point, responsibility for the redistribution was transferred to Elections BC, which had less than one year to implement the new electoral districts ahead of the commencement of the May 12, 2009 General Election and Referendum on Electoral Reform.

The implementation phase

'Walking the lines' a second time: implementing the Legislative Assembly's approved boundaries

March 2008 - April 2008

Under the current redistribution model, the first step in implementing a new set of electoral district boundaries is aligning them to Elections BC's GIS, INDEA. The other redistribution activities, such as dividing the electoral districts into voting areas, preparing map products and updating the voters list, are driven by INDEA, and require that the new electoral districts be properly aligned to the Elections BC base map.

By March 2008, Elections BC had aligned large portions of two separate sets of electoral district boundaries: the commission's 81 preliminary proposed electoral districts and its 83 final proposed electoral districts. Elections BC had also conducted a review of the existing 79 electoral districts in case the Legislative Assembly chose to retain them for the 2009 General Election and Referendum. Most of this work was unplanned for, and created additional pressure by condensing the already-shortened implementation timeline.

Following the introduction and passage of Motion 39 on March 13, 2008, Elections BC began aligning the 85 electoral districts endorsed by the Legislative Assembly. Because the 85 electoral districts differed from the commission's 83 proposed electoral districts in only a few regions, the necessary alignment work was minimal compared to previous sets of boundaries.

Overall, however, the time and resources committed to alignment activities far exceeded Elections BC's original estimates, which had predicted that there would be few changes to the commission's preliminary proposals. It was assumed that most of the alignment work would be completed in the fall of 2007, with only minor adjustments thereafter. Initially scheduled to last two weeks, the electoral district alignment process in fact spanned two and a half months, draining resources from other activities and delaying the start of other critical implementation projects.

Dividing the electoral districts into voting areas

March 2008 - August 2008

After the new electoral district boundaries had been aligned to the INDEA base map, the process of dividing them into voting areas could begin. While some voting areas had been created for the commission's preliminary 81 electoral districts, many of these had to be reviewed and adjusted to conform to the 85 electoral districts. Thousands more still had to be designed.

Elections BC began by reviewing its list of institutions that warranted designation as site-based voting areas. Site-based voting areas are for voters who reside permanently at a designated location, require extra assistance in order to vote and who may be unable to visit other voting opportunities. Authorized by section 80 of the *Election Act*, site-based

voting areas are often established at long-term care facilities, nursing homes and mental health facilities. Using its list of sites from the 2005 General Election, as well as internet searches and phone books, Elections BC generated a list of over 500 potential site-based voting areas .

Site-based voting areas had to be identified before regular voting areas could be created because site-based voting area populations are not included when calculating the number of voters resident in a surrounding voting area. Even though a site-based voting area may be located within the boundaries of another voting area, its residents do not count against the surrounding voting area's 400 registered voter limit. Identifying site-based voting areas first thus limits unnecessary changes to regular voting area boundaries later in the implementation phase.

Elections BC sent the proposed site-based voting area locations to the newly-hired District Electoral Officers (DEOs) for review in April 2008. The purpose of the site-based voting area review was to confirm the list prepared by Elections BC and identify any additional facilities that might qualify as site-based voting areas. The review confirmed approximately 90% of the locations identified by Elections BC headquarters staff.

To create voting areas, GIS technicians at Elections BC used a semi-automated tool in INDEA called the Redistribution Tool. The tool calculated the optimal location for voting area boundaries based on rules set by Elections BC management. One rule required that each voting area contain between 325 and 375 voters (to accommodate future population growth without surpassing the 400 voter maximum), while other rules prohibited voting areas from crossing municipality and Indian reserve boundaries and major highways. After considering these parameters, the tool automatically divided the target electoral district into voting areas.

The next step was to meticulously review the tool's proposed voting area boundaries. The GIS technicians had to ensure the voting areas reflected local realities and, to the greatest extent possible, facilitated convenient access to potential voting places. The province's diverse communities and geography caused the tool to occasionally create impractical voting areas. The rule requiring adherence to municipal boundaries, for example, occasionally separated clusters of houses from the communities with which they were associated but not legally a part of. Without addressing these cases, the affected residents may have been assigned to distant voting places rather than to voting places in the communities they considered home. Accessibility to voting opportunities was a major focus during voting area creation activities.

Complicating this portion of the redistribution were ongoing changes to the INDEA base map. The various layers of spatial data in INDEA had to be continuously updated as new roads and buildings were constructed and administrative boundaries changed. Municipal incorporations and expansions, for example, required GIS technicians to review and adjust nearby voting area boundaries, often erasing hours of previous work.

The creation and review of voting area boundaries was a complex and lengthy task. Using their professional judgement and technical acumen, the GIS technicians spent many hours carefully refining the voting area boundaries generated by the Redistribution Tool. Often, these refinements necessitated changes to adjacent voting areas, triggering a cascading series of changes that affected nearly every voting area in an electoral district. The voting area creation

process ultimately consumed over 3,500 resource hours (an average of about 14 weeks for each GIS technician) and resulted in the establishment of 10,184 voting areas across the province.

Ensuring accessibility: reviewing voting areas

August 2008 - February 2009

In August 2008, DEOs conducted a field review of the voting area boundaries. Each DEO was sent maps of the preliminary voting areas in their electoral district, along with a list of the voting places used in the 2005 General Election. The maps showed an existing registered voter count and a total estimated eligible voter count for each voting area. The difference between the two counts represented the number of additional voters expected to register for the May 12, 2009 General Election.

Taking these figures into consideration, the DEOs assessed the accessibility of each voting area, identified new residential developments that may have affected voting area populations and highlighted other general issues, such as misspelled map features or unidentified rural access roads. DEOs were asked to recommend boundary adjustments where necessary.

Together with minor voting area adjustments resulting from later general election-related work, the field review of site-based voting areas and voting areas proved enormously helpful. It allowed the GIS technicians to adjust the voting areas to reflect local knowledge. It also enhanced the longevity of the voting area boundaries and minimized the updates that will be needed to facilitate their use in future elections. While additional field reviews would have been beneficial, the condensed timeline made doing so impractical.

Creating map products

March 2008 - March 2009

Electoral district and voting area map products are a critically important resource for Elections BC and its clients. Political parties and candidates use electoral district maps to coordinate their campaigns, voters access the Know Your Electoral District web application to find information about voting places and DEOs depend on a variety of boundary-related products to administer elections. For the 2008 redistribution, Elections BC created over 650 unique map products of the new electoral districts and voting areas. The map creation portion of the implementation phase lasted over a year and required nearly 10,000 resource hours.

Table 2: Selected map products and related data created for the 2008 redistribution

Product	Description
Provincial electoral district/Selected areas wall map	A two-sided colour product. One side depicts all 85 electoral districts; the other shows selected areas where additional detail is needed to identify the location of electoral district boundaries.
Conversion table	A text table correlating the 79 electoral districts and their associated voting areas to the 85 electoral districts and their associated voting areas.
Street index	A list of street names by electoral district showing the voting areas to which particular address ranges are assigned.
Voting area field review maps	Gray-scale maps produced for the DEO field review of voting areas.
Location Index electoral district maps	Colour electoral district maps for the Location Index, a document listing locations (e.g. municipalities, hospitals, islands etc.) and their associated electoral districts.
Electoral district/ voting area (ED/VA) maps	Maps depicting the voting areas in each electoral district. The number of maps per electoral district ranges from one to 18. A complete set contains 469 map sheets.
Updates to Know Your Electoral District, Online Voter Registration	Elections BC website applications. Know Your Electoral District provides voter-relevant data for each electoral district based on a submitted address, and Online Voter Registration allows voters to register or update their registration online.

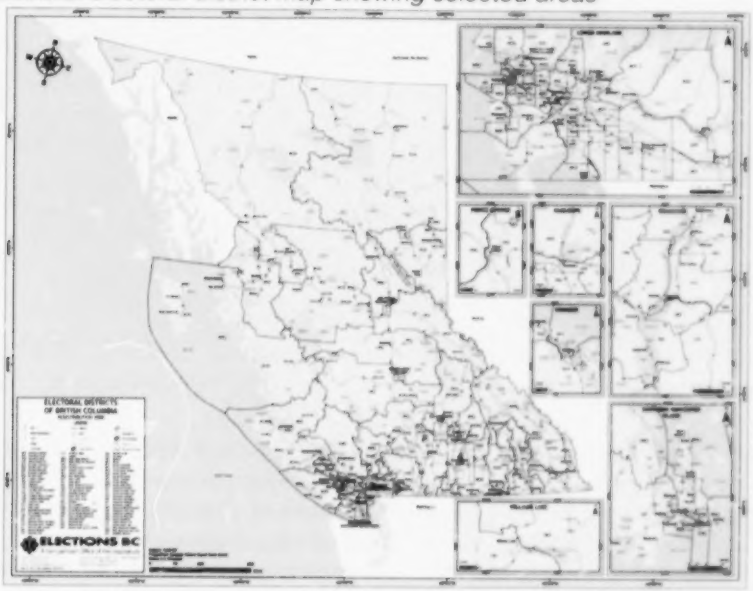
Section 80 (7) of the *Election Act* requires Elections BC to publish notice of the boundaries of new voting areas, or of where materials showing the boundaries are located, in the *British Columbia Gazette*. Under Section 80 (8), Elections BC must also make maps of the new voting areas and a street index, if one is prepared, available for public inspection during regular office hours. To provide its clients with sufficient time to review these products prior to the May 12, 2009 General Election, as well as to coincide with a training conference for DEOs and their deputies, Elections BC set November 13, 2008 as the deadline for completing the new maps and publishing notice in the *Gazette*.

Work on the map products depicting the new boundaries began in February 2008, after the commission had submitted its final proposals. Although scheduled to begin in September 2007, turnover among temporary mapping staff delayed the start of map production until later in the implementation phase. Motion 39 prompted additional changes to the maps to reflect the Legislative Assembly's approval of 85, rather than 83, electoral districts.

The first product created was a provincial map showing the boundaries of the 85 electoral districts. To create the map, staff developed a template by reviewing the maps designed by the Vancouver-based GIS technicians for the commission's preliminary and final reports. Templates speed the map production process by predetermining a map's appearance and contents. By setting out ahead of time which layers of data to display (e.g. roads,

hydrography, etc.), maps can be quickly generated and, when new versions are required, easily revised to reflect new information. Using the template, staff began preparing a 71 cm x 91.4 cm wall map of the province depicting the 85 electoral districts. Similar templates were developed for the other map products.

Figure 9: Provincial electoral district map showing selected areas



The provincial map showing all 85 electoral districts along with selected areas where additional detail is necessary. Its production size is 71 cm x 91.4 cm.

The next product was a map of selected areas, designed to provide additional clarification in densely populated communities where discerning the precise location of an electoral district boundary from a provincial perspective can be difficult. Although initially planned as a stand-alone item, for reasons of cost and convenience it was combined with the electoral district wall map to form a single double-sided product.

February 2008 also saw preliminary work on the Location Index. The Location Index is a bound document containing a list of locations in British Columbia (including municipalities, neighbourhoods, public institutions and islands) and their associated electoral districts. The Location Index allows voters who are voting outside their electoral district to determine their electoral district of residence. To enhance its usefulness as a reference tool, the Location Index includes full-page colour maps of each electoral district.

hydrography, etc.), maps can be quickly generated and, when new versions are required, easily revised to reflect new information. Using the template, staff began preparing a 71 cm x 91.4 cm wall map of the province depicting the 85 electoral districts. Similar templates were developed for the other map products.

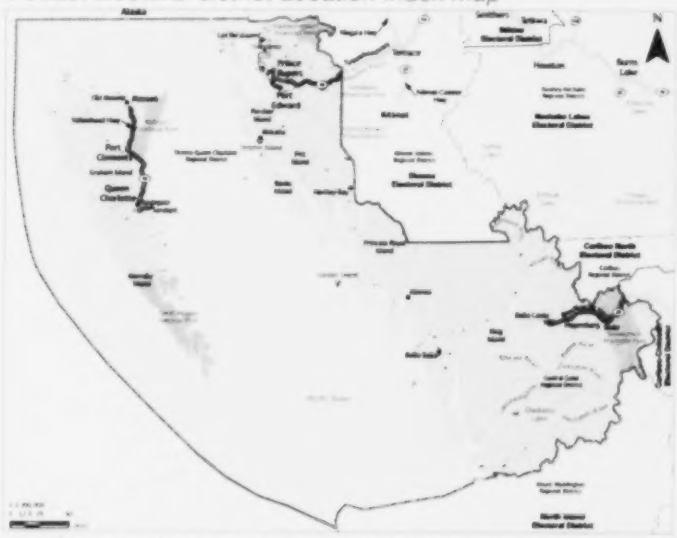
Figure 9: Provincial electoral district map showing selected areas

The provincial map showing all 85 electoral districts along with selected areas where additional detail is necessary. Its production size is 71 cm x 91.4 cm.

The next product was a map of selected areas, designed to provide additional clarification in densely populated communities where discerning the precise location of an electoral district boundary from a provincial perspective can be difficult. Although initially planned as a stand-alone item, for reasons of cost and convenience it was combined with the electoral district wall map to form a single double-sided product.

February 2008 also saw preliminary work on the Location Index. The Location Index is a bound document containing a list of locations in British Columbia (including municipalities, neighbourhoods, public institutions and islands) and their associated electoral districts. The Location Index allows voters who are voting outside their electoral district to determine their electoral district of residence. To enhance its usefulness as a reference tool, the Location Index includes full-page colour maps of each electoral district.

Figure 10: North Coast electoral district Location Index map



A Location Index map showing the North Coast electoral district. Its production size is 21.6 cm x 28 cm.

In addition to these and other products, in June 2008, Elections BC began designing the voting area-based map products as the voting areas were created in INDEA. Specifically, staff initiated work on the electoral district/voting area (ED/VA) maps showing the voting area boundaries in each electoral district. Given the large number of maps needed to depict 10,184 voting areas, Elections BC chose at this point in the event to expand its complement of temporary GIS technicians.

Figure 11: Voting areas in the Kelowna-Lake Country ED/VA map

An ED/VA map showing voting areas in the Kelowna-Lake Country electoral district. Its production size is 61 cm x 91.4 cm.

Figure 10: North Coast electoral district Location Index map

A Location Index map showing the North Coast electoral district. Its production size is 21.6 cm x 28 cm.

In addition to these and other products, in June 2008, Elections BC began designing the voting area-based map products as the voting areas were created in INDEA. Specifically, staff initiated work on the electoral district/voting area (ED/VA) maps showing the voting area boundaries in each electoral district. Given the large number of maps needed to depict 10,184 voting areas, Elections BC chose at this point in the event to expand its complement of temporary GIS technicians.

Figure 11: Voting areas in the Kelowna-Lake Country ED/VA map

An ED/VA map showing voting areas in the Kelowna-Lake Country electoral district. Its production size is 61 cm x 91.4 cm.

The prevailing labour market conditions, however, made hiring sufficient temporary staff difficult. GIS software is highly sophisticated, and requires operators who are well-educated and adept in geographic data management, analysis and cartographic production. GIS technicians were, and remain, highly sought after. The attainment of full staffing levels was delayed considerably, and high turnover hindered training and planning efforts. Other recruitment options, such as seconding GIS technicians from the Integrated Land Management Bureau and Elections Ontario, were implemented to overcome the staffing shortfall.

By November 2008, when the ED/VA map work was at its busiest, Elections BC had hired 12 temporary GIS technicians. Their experience and skills varied, resulting in ED/VA maps of varying quality. This, in turn, required considerable work by senior staff to review hundreds of map iterations to ensure quality and consistency. These challenges prompted Elections BC to adjust some of its original target deadlines and product specifications. For example, the deadline for publishing notice of the new voting area boundaries in the *Gazette* was extended, and the labelling on the maps provided to DEOs for voting place selection was reduced.

During this period, Elections BC also updated its Know Your Electoral District and Online Voter Registration website applications. Know Your Electoral District provides demographic data, an interactive map and, during event periods, information regarding voting locations and voting times within each electoral district. Online Voter Registration allows voters to register or update their registration online. To enhance public awareness of the redistribution, Elections BC updated the two applications in November 2008 to display information about both the existing and future set of electoral district boundaries. When a voter registered using the Online Voter Registration system, the application displayed the voter's electoral district of residence at the time, as well as their electoral district as of April 14, 2008 (when the new boundaries were scheduled to come into effect).

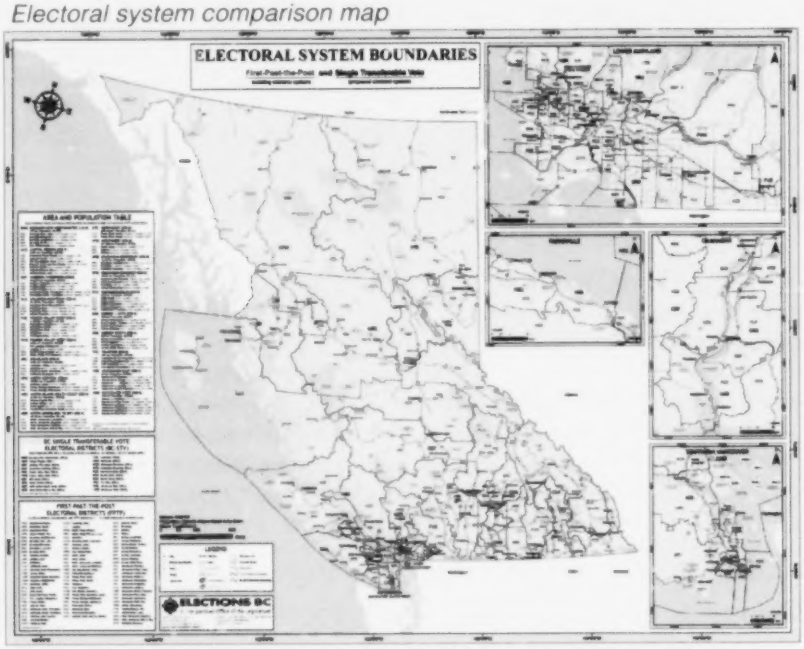
In December 2008, Elections BC felt confident that its suite of electoral district and voting area map products, including the electoral district wall map, the selected areas map, the Location Index and the ED/VA maps, were of sufficient quality for public use. On December 18, 2009, Elections BC published notice in the *Gazette* that electronic versions of these products were available for viewing on its website. Elections BC also sent DVDs containing the map products to MLAs and all registered political parties.

In January 2009, as a result of anomalies discovered by DEOs during the assignment of voting places, Elections BC modified the boundaries of 44 voting areas. The various map products were updated accordingly, and a second letter to MLAs and political parties was sent clarifying the changes. A second *Gazette* notice was also published, on February 12, 2009.

In addition to these items, a number of additional map products were identified and designed in early 2009. On December 11, 2008, the Electoral Reform Referendum 2009 Act Regulation was passed, setting out the specific guidelines for conducting the second

Referendum on Electoral Reform. Section 25 of the Regulation required Elections BC to present information about both the first-past-the-post and the BC-STV electoral systems at every voting opportunity. Although Elections BC had anticipated the need to prepare BC-STV map products, their specific format remained unknown until passage of the Regulation. To help fulfill its obligation, Elections BC prepared three provincial electoral district maps. One depicted the 85 first-past-the-post electoral district boundaries, another depicted the BC-STV electoral district boundaries proposed by the commission and the third depicted both sets of boundaries overlaid against one another.

Figure 12: Electoral system comparison map



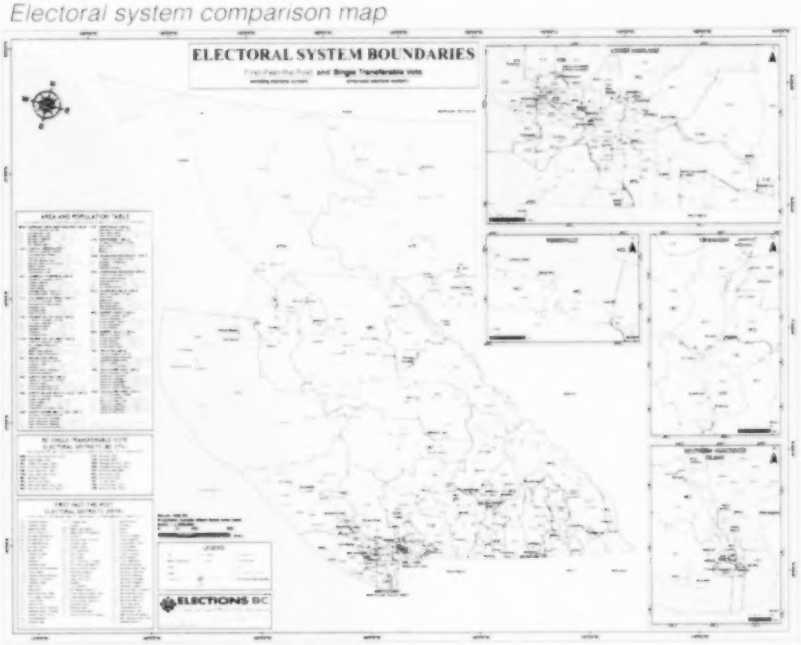
The provincial electoral district map showing both first-past-the-post (red) and BC-STV (yellow) boundaries. Its production size is 71 cm x 91.4 cm.

Other additional map products included website applications comparing the existing 79 electoral district boundaries to the future 85 electoral district boundaries and comparing the BC-STV electoral district boundaries proposed by the commission to the first-past-the-post electoral district boundaries. Large wall maps of the province, the Lower Mainland and Vancouver Island suitable for display were also produced.

The design, review and distribution of map products for the new electoral districts and voting areas was the most time-consuming and labour-intensive aspect of Elections BC's role in the 2008 redistribution. Spanning 13 months and involving the efforts of nearly 40 permanent and temporary staff, the map creation project resulted in a comprehensive suite of digital and printed maps integral to the administration of the May 12, 2009 General Election and Referendum on Electoral Reform.

Referendum on Electoral Reform. Section 25 of the Regulation required Elections BC to present information about both the first-past-the-post and the BC-STV electoral systems at every voting opportunity. Although Elections BC had anticipated the need to prepare BC-STV map products, their specific format remained unknown until passage of the Regulation. To help fulfill its obligation, Elections BC prepared three provincial electoral district maps. One depicted the 85 first-past-the-post electoral district boundaries, another depicted the BC-STV electoral district boundaries proposed by the commission and the third depicted both sets of boundaries overlaid against one another.

Figure 12: Electoral system comparison map



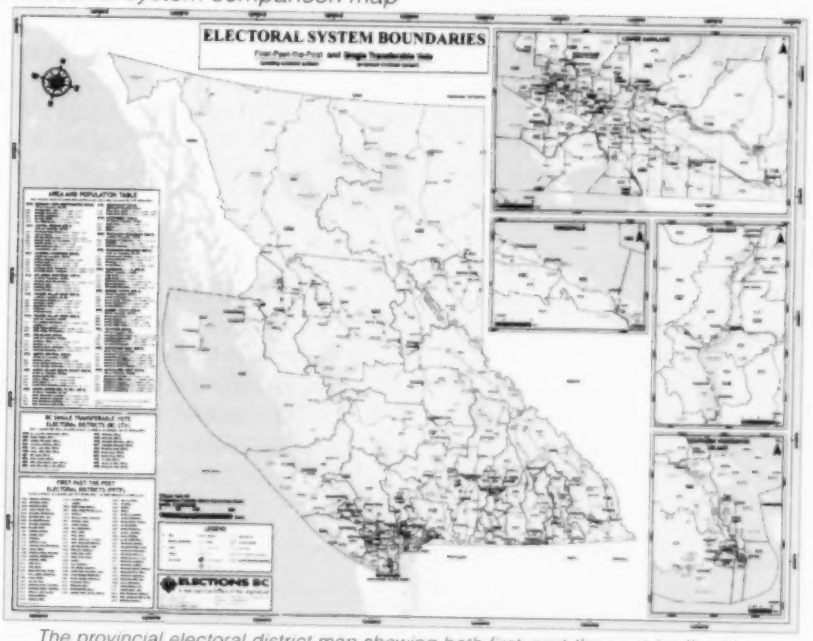
The provincial electoral district map showing both first-past-the-post (red) and BC-STV (yellow) boundaries. Its production size is 71 cm x 91.4 cm.

Other additional map products included website applications comparing the existing 79 electoral district boundaries to the future 85 electoral district boundaries and comparing the BC-STV electoral district boundaries proposed by the commission to the first-past-the-post electoral district boundaries. Large wall maps of the province, the Lower Mainland and Vancouver Island suitable for display were also produced.

The design, review and distribution of map products for the new electoral districts and voting areas was the most time-consuming and labour-intensive aspect of Elections BC's role in the 2008 redistribution. Spanning 13 months and involving the efforts of nearly 40 permanent and temporary staff, the map creation project resulted in a comprehensive suite of digital and printed maps integral to the administration of the May 12, 2009 General Election and Referendum on Electoral Reform.

Referendum on Electoral Reform. Section 25 of the Regulation required Elections BC to present information about both the first-past-the-post and the BC-STV electoral systems at every voting opportunity. Although Elections BC had anticipated the need to prepare BC-STV map products, their specific format remained unknown until passage of the Regulation. To help fulfill its obligation, Elections BC prepared three provincial electoral district maps. One depicted the 85 first-past-the-post electoral district boundaries, another depicted the BC-STV electoral district boundaries proposed by the commission and the third depicted both sets of boundaries overlaid against one another.

Figure 12: Electoral system comparison map



The provincial electoral district map showing both first-past-the-post (red) and BC-STV (yellow) boundaries. Its production size is 71 cm x 91.4 cm.

Other additional map products included website applications comparing the existing 79 electoral district boundaries to the future 85 electoral district boundaries and comparing the BC-STV electoral district boundaries proposed by the commission to the first-past-the-post electoral district boundaries. Large wall maps of the province, the Lower Mainland and Vancouver Island suitable for display were also produced.

The design, review and distribution of map products for the new electoral districts and voting areas was the most time-consuming and labour-intensive aspect of Elections BC's role in the 2008 redistribution. Spanning 13 months and involving the efforts of nearly 40 permanent and temporary staff, the map creation project resulted in a comprehensive suite of digital and printed maps integral to the administration of the May 12, 2009 General Election and Referendum on Electoral Reform.

Integrating the boundaries: redistributing the voters list

September 2007 - April 2009

Since the 2001 General Election, Elections BC has used the Electoral Information System (EIS) database to support its delivery of provincial electoral events. EIS contains the provincial voters list, including the names, addresses and dates of birth of registered voters. EIS also stores event-specific data, such as candidate names, the location of voting places and a registry of DEOs and other officials.

During a redistribution, the voters list must be redistributed based on the new electoral districts and voting areas. This requires that the information in EIS be realigned to reference the new boundaries in INDEA.

Failing to do so could have serious event delivery implications. For example, voters could be assigned to incorrect electoral districts, causing them to cast their ballot for the wrong election. On a large scale, such errors could result in a controverted election. Properly integrating the new electoral district and voting area boundaries with EIS data thus represents one of the most critical parts of the implementation process.

Preparations for the integration project began in September 2007. Elections BC documented an integration strategy which included three rounds of progressive testing. The deadline for full integration was set for February 13, 2009, the last date when Elections BC assumed an electoral event could reasonably have been initiated under the 79 electoral districts.

Under the *Recall and Initiative Act*, the CEO must issue a petition to an initiative proponent within 60 days of approving their application. For an initiative petition application approved after February 13, 2009, a petition could not be issued until April 14, 2009 or later, resulting in the initiative petition being conducted under the 85 electoral districts that would then be in force.

The integration process proceeded efficiently and on schedule. The progressive rounds of testing revealed that a vast majority of the addresses in EIS would be automatically assigned to their correct new electoral district and voting area. The remaining addresses, which during testing were mis-assigned for a variety of technical reasons, were nearly all identified and corrected. The testing also ensured that other computer applications linked to EIS and INDEA, including Online Voter Registration, the Voting Results System and the Political Contributions System, would not be disrupted when the integration occurred.

In November 2008, Elections BC decided to move the actual integration date forward to January 25. Doing so allowed voters who registered in the first two weeks of the enumeration (which began on February 2, 2009 and lasted until April 21, 2009) to be recorded immediately against the new boundaries. It also removed the risk that the integration might cause disruptions to Online Voter Registration during the enumeration, and provided additional time to clean up mishandled addresses not caught in testing. If an

initiative petition application were to be received, it was determined that a copy of the data based on the previous electoral district boundaries could be used.

The integration occurred as scheduled on January 25, 2009. From February 2009 to April 2009, Elections BC conducted an audit to determine its success. Initially, about 7,000 addresses (representing only a tiny fraction of the approximately two million residential addresses in INDEA) were found to have been incorrectly assigned to a new electoral district and voting area. By April 2009, these cases had been completely resolved. During the general election, six additional mis-assignments were identified and corrected, with relatively little inconvenience to the affected voters.

Conducting electoral finance and communication activities

March 2008 - May 2009

In addition to establishing voting areas, creating map products and integrating data, redistributions entail significant work in the areas of electoral finance and public communications.

Section 166 (2) of the *Election Act* requires Elections BC to automatically deregister the constituency associations for an electoral district that is disestablished. A redistribution thus requires Elections BC to facilitate the deregistration of all registered constituency associations, and the subsequent registration of new constituency associations under the new electoral district boundaries.

In July 2008, Elections BC contacted all registered constituency associations and their associated political parties to explain the deregistration process and the benefits of early voluntary deregistration. Included in the correspondence was a checklist of the necessary deregistration steps, as well a similar checklist for parties that wished to register constituency associations under the new electoral districts. Constituency associations were encouraged to deregister before the end of 2008. Under the electoral finance rules in the *Election Act*, doing so reduced the deregistration paperwork they were required to complete, and lessened the workload for Elections BC during the election period and in the months following.

Elections BC also issued a newsletter to all registered political parties regarding the redistribution, and the matter was the topic of presentations and discussion at the annual information session for political parties on November 28, 2008.

As a result of sustained outreach efforts, 120 of the 164 registered constituency associations deregistered in 2008, with a further 11 deregistering before April 14, 2009. Thirty-three constituency associations were automatically deregistered. This represents a significant improvement over the previous redistribution, in which 97 constituency associations were automatically deregistered when the existing 75 electoral districts were disestablished in 2001. Of note, only 90 constituency associations were registered under the 85 new electoral districts as of August 2009.

Elections BC supplemented its implementation activities with communications to inform voters of the new electoral districts. As part of the enumeration conducted ahead of the May 12, 2009 General Election, Elections BC mailed customized letters to nearly two million residential addresses. In addition to calling on voters to take action and register or update their registration, each letter included the name of the new electoral district for that address. A flyer mailed to every household shortly before the election provided additional redistribution information, as well as the electoral district maps comparing BC-STV boundaries to first-past-the-post boundaries. Detailed information was also made available on the Elections BC website.

The new boundaries take effect

April 2009

With the exception of review and wrap-up activities, the 2008 redistribution concluded on April 14, 2009, when the writs of election were issued for the 39th Provincial General Election. In accordance with the *Electoral Districts Act*, the 79 existing electoral districts were disestablished and replaced by the 85 new electoral districts. Candidates, political parties, election advertising sponsors and others campaigned on the basis of the new electoral districts, and on May 12, 2009, more than 1.5 million voters voted in 10,184 new voting areas.

Analysis and conclusion

Effects on the general election and referendum

Within the broader context of achieving effective representation, Elections BC's primary duty in a redistribution is to accurately implement new electoral district boundaries. This undertaking involves considerable scope and risk, and a poorly implemented redistribution can cause voter confusion, delays at voting places and doubts about the accuracy of election results. One method of determining the efficacy of a redistribution is to measure its impact on subsequent elections.

By that measurement, the 2008 redistribution was a success. Nearly all voters were assigned to the correct electoral district prior to the election being called, and there were very few reports that the new boundaries had caused confusion or disruption during the election.

A pre-election survey conducted by BC Stats on behalf of Elections BC showed that less than half of the voters surveyed were aware that a redistribution had occurred. Only 49% of respondents correctly identified that the provincial electoral district boundaries had changed since the last election. Thirty-one percent responded that the electoral district boundaries had not changed, while the remaining 19% stated that they were unsure. The period during which the survey was conducted, April 29 to May 6, 2009, included the first day of advance voting.

Over the course of the entire election period (April 14 to June 3, 2009), Elections BC received 105 complaints regarding accessibility. However, this number is typical of a general election, and is not indicative of widespread dissatisfaction with the results of the redistribution. Moreover, many of the complaints were actually directed at the location of voting places, which can change at each election and may or may not have been caused by an electoral district or voting area boundary adjustment. Overall, the redistribution is believed to have had little negative impact on the accessibility and convenience of voting in the election and referendum.

A second survey conducted by BC Stats after General Voting Day confirms this conclusion. A large majority of respondents answered positively to questions about the ease of voting and the accessibility of voting places. Both the pre- and post-event surveys are available on the Elections BC website.

Table 3: Selected data from the 2009 Elections BC Voter/Non-Voter Satisfaction Survey

Prompt	Response
"How easy or difficult was it to locate your voting place or a place to vote?"	94% positive
"Was the voting place in a convenient location?"	93% positive
"Voting is easy."	81% positive
"The main reason I did not vote was because:	
I didn't know where to vote.	2%
The voting location was not convenient."	2%

Redistribution timeline

The success of the redistribution was achieved despite a condensed timeline. The 26 months allotted the commission, as well as delays caused by Bill 39, reduced the time available for Elections BC to create voting area boundaries, design map products and perform other redistribution activities. Unanticipated issues, such as a need to split census blocks, a tight labour market and a regulatory requirement to prepare BC-STV maps further complicated the implementation phase and made reaching critical deadlines challenging.

The specific consequences of the shortened timeline were numerous. It limited opportunities for receiving local input on voting area boundaries to a single review by DEOs. The map products underwent fewer quality assurance checks than had been planned for, and several minor errors were discovered following their publication. In addition, a number of map products were labelled less comprehensively than originally intended, a product of both unexpected delays and the varying skills of temporary GIS technicians.

Redistributions are complex undertakings with important ramifications for the provincial electoral process. Their successful administration requires considerable time. While advances in GIS technology have automated some redistribution activities, the key indicators of success – electoral districts that provide effective representation, accessible voting area boundaries, the accurate assignment of voters to electoral districts and clear and accurate map products – stem from extensive, manual processes.

Shortening the time for the implementation of a redistribution can introduce risks and negatively affect its outcomes. In extreme cases, a poorly implemented redistribution can result in a controverted election. For this reason, it is crucial that sufficient time be provided for both the development and implementation of new electoral district and voting area boundaries, and that redistributions be acknowledged as involving more than simply a "push of a button" or a "click of a mouse."

Digital boundary descriptions

The Cohen Commission submitted its proposals in digital form rather than as written metes and bounds descriptions. It was the first commission in Canadian electoral boundary history to do so. Together with its final report, the commission provided the Speaker of the Legislative Assembly with a DVD containing its proposed electoral district boundaries (including its Bill 39 scenarios for the North and Cariboo-Thompson regions) in digital form. By citing the DVD as the source of the areas and boundaries of the electoral districts in the *Electoral Districts Act*, the Legislative Assembly set the digital shapefiles as the definitive, legal descriptions of the 85 new electoral districts.

Maintaining digital boundary descriptions raises issues foreign to metes and bounds descriptions. Among them are discrepancies resulting from base map inconsistencies. Because the commission's electoral district proposals were drawn on the INDEA base map, they are aligned to the position of geographic features and administrative boundaries in that context. When viewed over different base maps, some electoral district boundaries will not align the same way due to positional inconsistencies between the base maps.

For example, the INDEA base map might show a river in one location, while another base map might show it a few metres to the east. An electoral district boundary that followed the river would appear out of place on the latter base map, as it would be aligned to the river's location as stored in INDEA. For voters, who can download the shapefiles from the Elections BC website, this issue is particularly apparent when the electoral districts are viewed in software such as Google Earth, which operates on a separate base map.

A second issue resulting from digital descriptions relates to base map updates. Elections BC continuously refines its base map to improve its accuracy. As it receives new information from the Integrated Land Management Bureau and other external data providers, Elections BC adjusts the position of geographic features to more accurately reflect their location in relation to other features. This, in turn, necessitates adjustments to the digital boundary files to ensure their alignment to the geographic features below them.

Elections BC performs these adjustments to uphold the intent of the commission and the Legislative Assembly. Although the coordinates in the shapefile are changed, the actual physical location of the electoral district boundary as intended by the commission and the Legislative Assembly remains the same (i.e. the electoral district continues to follow the river, regardless of the river's specific placement on the Elections BC base map). Elections BC considers the intent of the Legislative Assembly to be critical, and is guided by the apparent intent of the placement of an electoral district boundary when confronted with base map adjustments.

Despite these issues, digital boundary descriptions hold important benefits that justify their continued and exclusive use. They reduce the potential for error by eliminating the need for individuals who may be unfamiliar with the intent of the Legislative Assembly to write the legal descriptions of the boundaries. For the same reason, digital files are also less costly to produce than metes and bounds. Further, digital files can be integrated directly into Elections BC's data systems, ensuring consistency throughout a redistribution by allowing Elections BC mapping staff to view the same geographic and demographic information used by the commission when proposing boundaries.

Digital files also facilitate the dissemination of electoral information. For Elections BC's clients, including voters, candidates, political parties and academics, digital files provide an accessible way of obtaining, distributing and analyzing data about electoral districts. In-depth analyses can be performed by downloading the shapefiles and layering them over demographic data and voting results. Coupled with the abundance of free GIS software, the digital files allow anyone with an Internet-capable computer to learn about the province's EDs easily and at virtually no cost, thus enhancing the inclusiveness and accessibility of the provincial electoral process.

Elections BC expenses

The following expenses were incurred by Elections BC in implementing the 2008 redistribution.

Redistribution costs

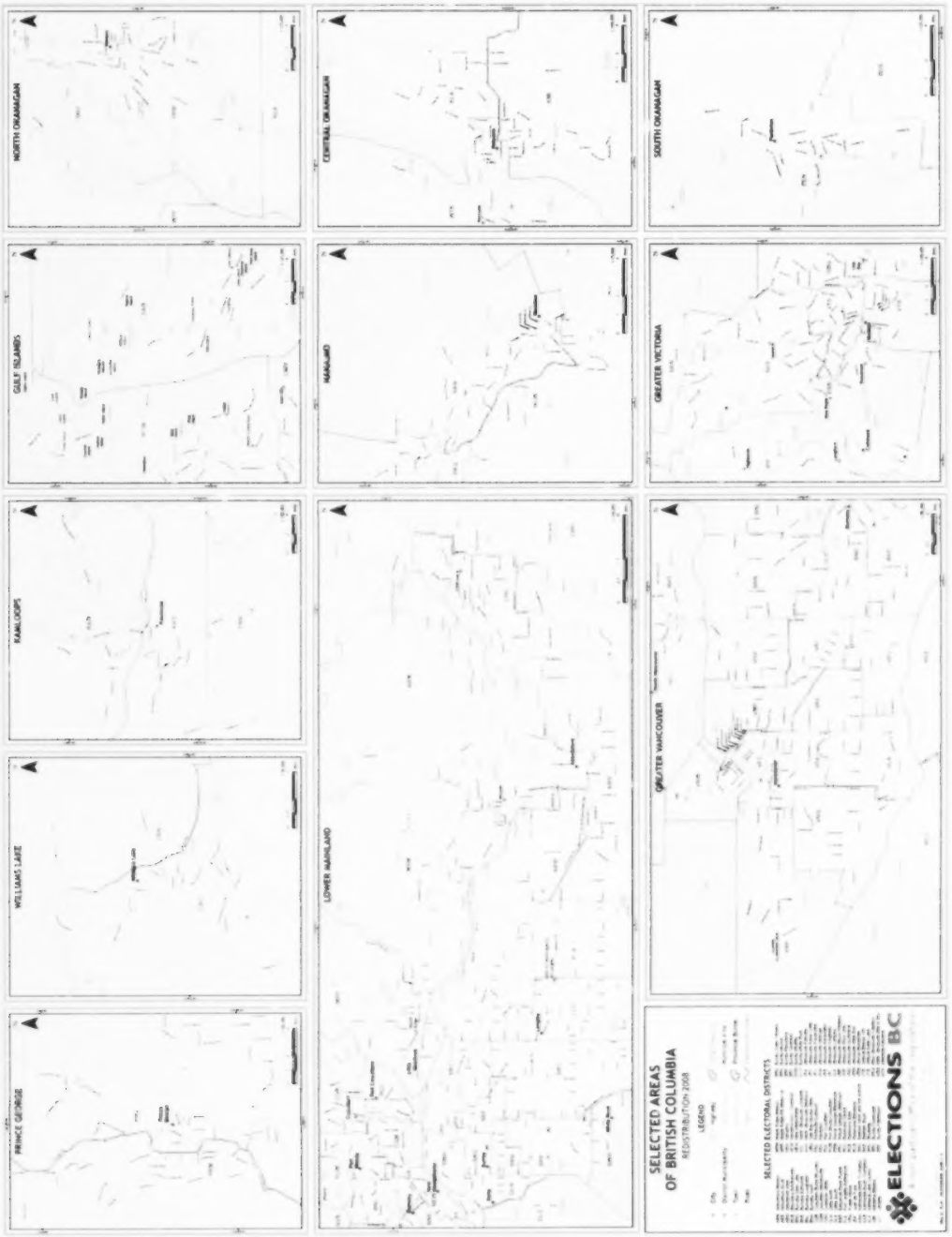
Expense categories	$
Salaries	1,040,646
Travel	30,878
Professional services	67,694
Information technology	599,380
General office services/supplies	566,380
Printing	123,503
Advertising	2,050
TOTAL	**2,430,531**

Appendices

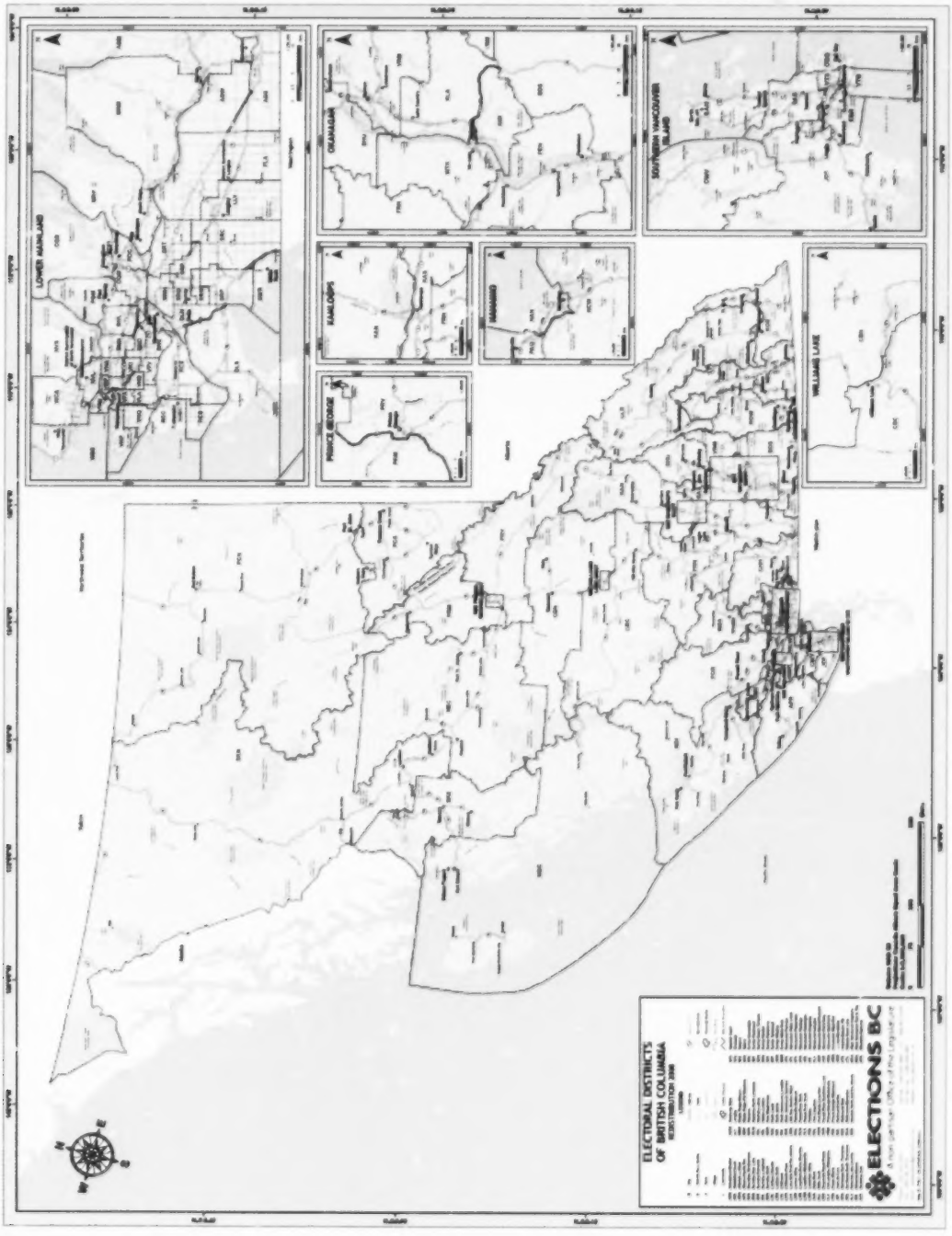
The following appendices contain depictions of map products created for the 2008 redistribution. The actual production size of each printed map product is displayed for reference. Several of the products are depicted at smaller resolutions in previous sections of the report. To view the full suite of printable map products, visit the Elections BC website at www.elections.bc.ca.

Appendix A: Depiction of the provincial electoral district map (71 cm x 91.4 cm)

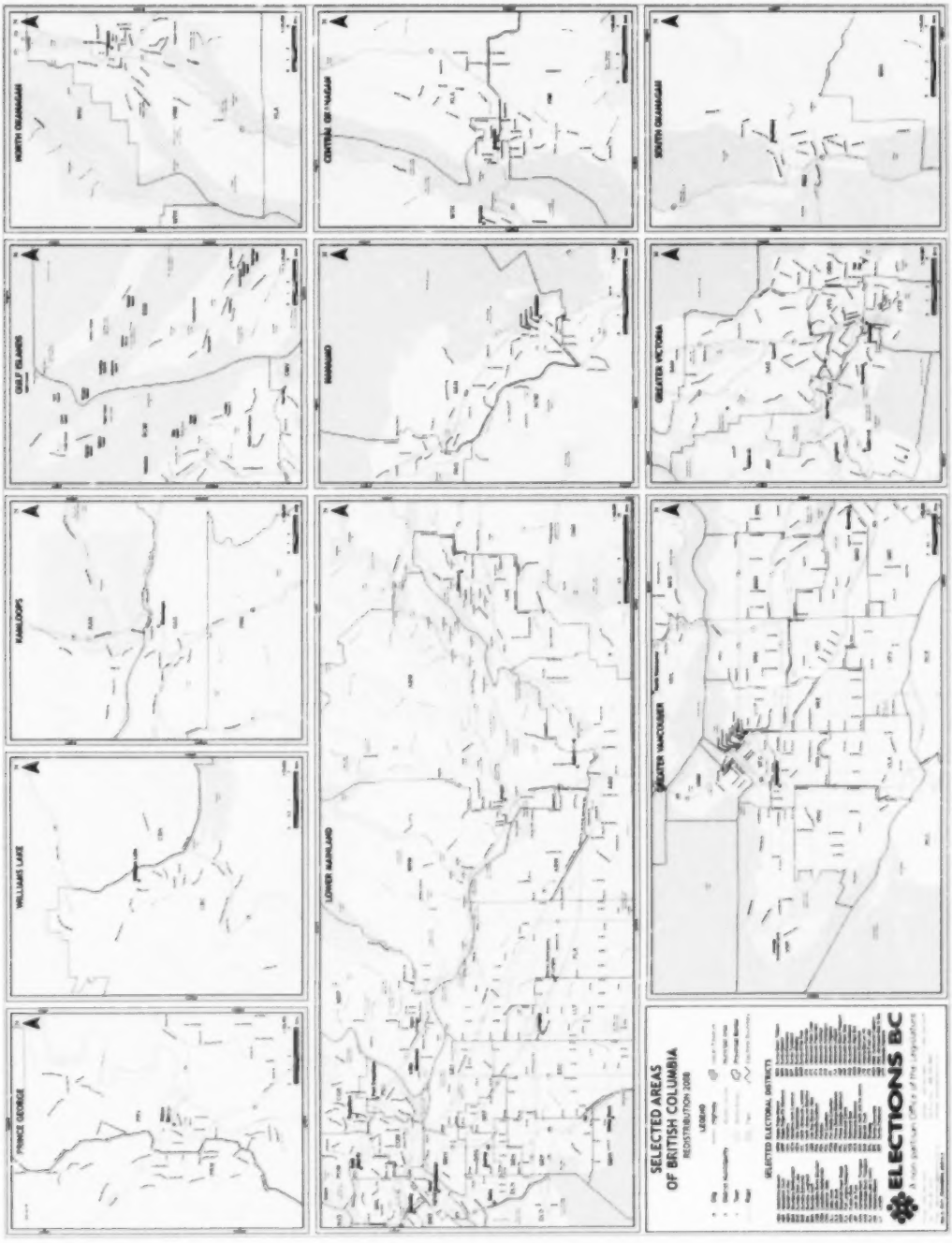
Appendix B: Depiction of the selected areas map (71 cm x 91.4 cm)



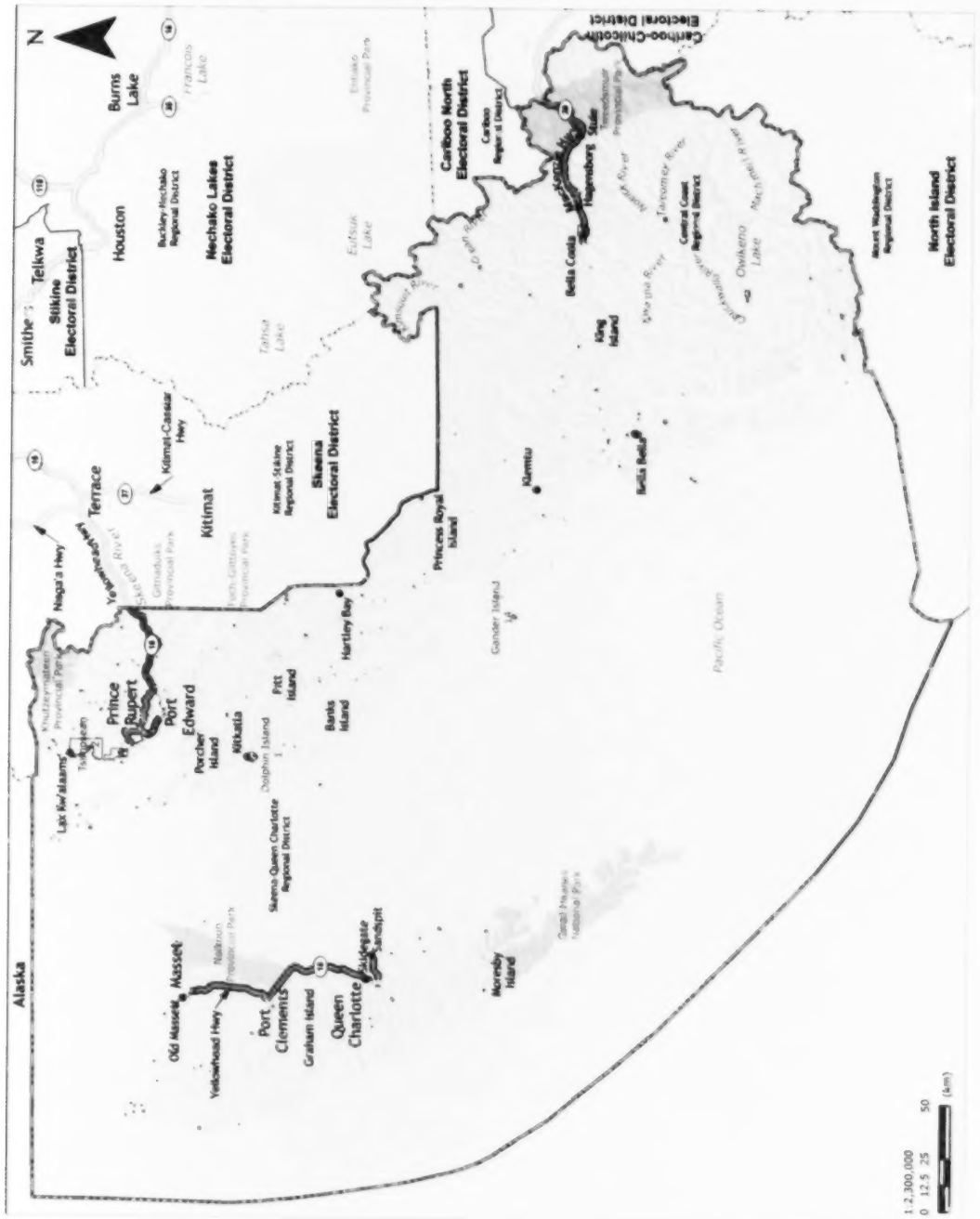
Appendix A: Depiction of the provincial electoral district map (71 cm x 91.4 cm)



Appendix B: Depiction of the selected areas map (71 cm x 91.4 cm)

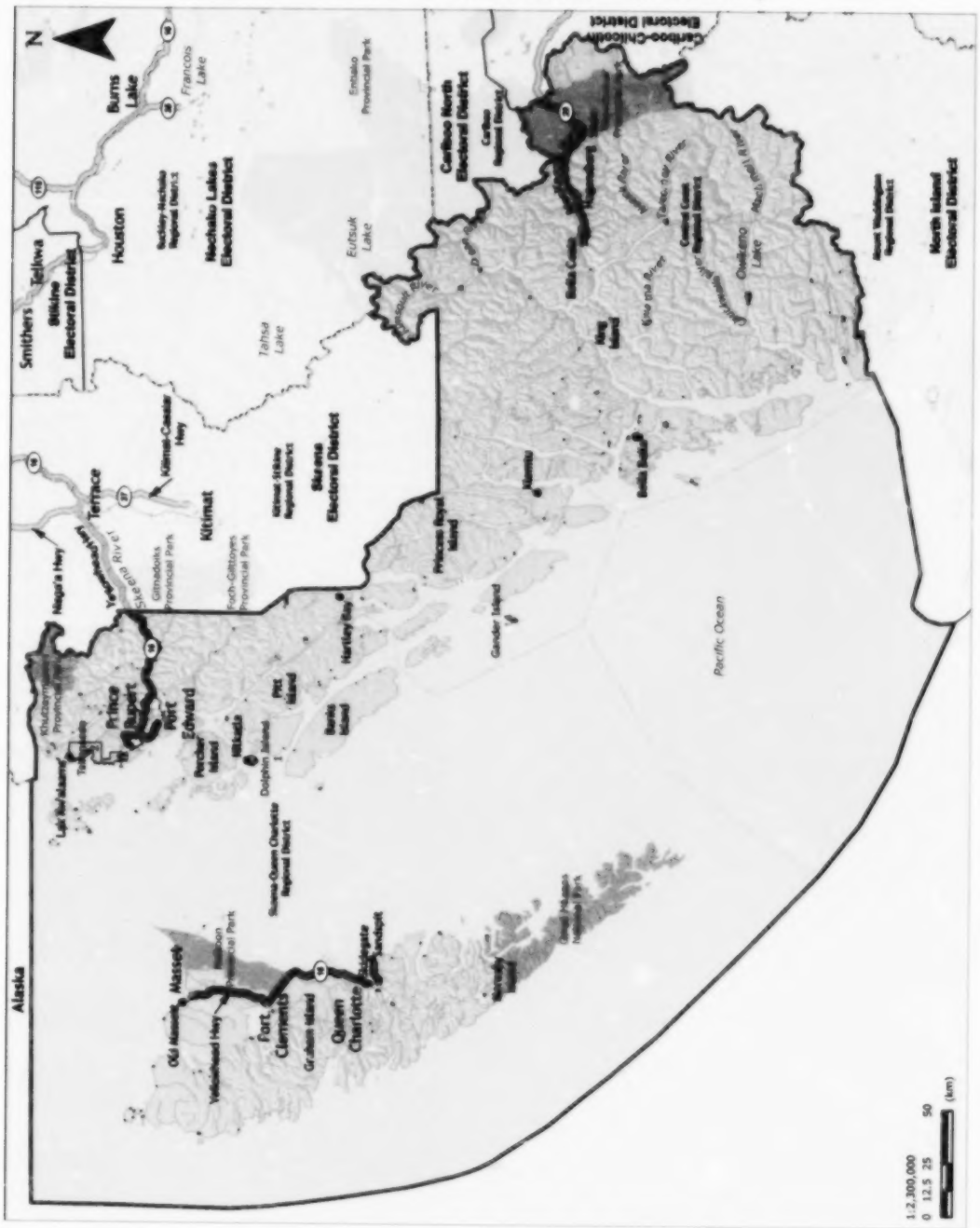


Appendix C: Depiction of a Location Index map (North Coast electoral district, 21.6 cm x 28 cm)

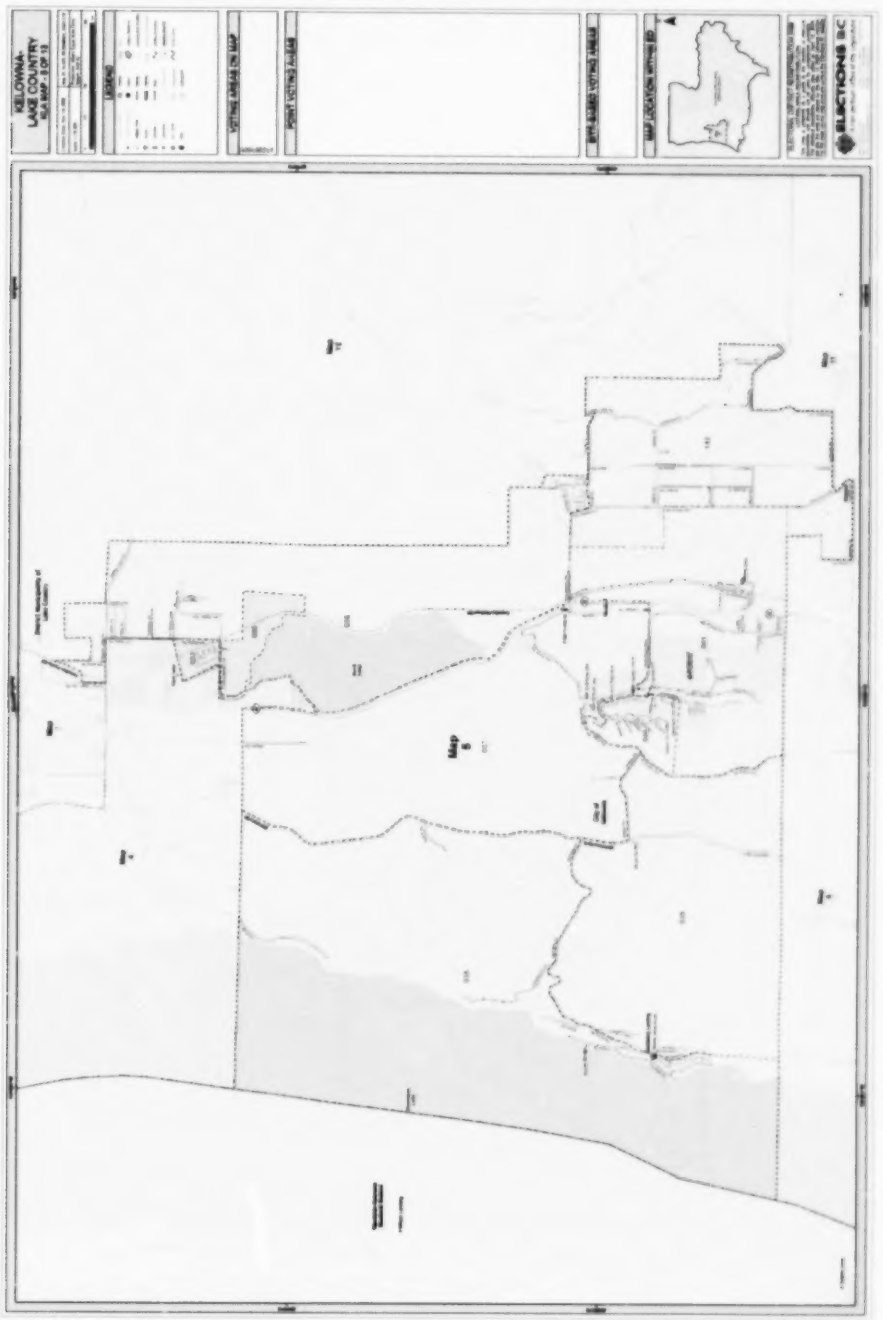

N
Burns Lake
Houston
Nechako Lakes Electoral District
Stikine Electoral District
Smithers
Telkwa
Terrace
Kitimat
Kitimat-Stikine Regional District
Skeena Electoral District
Caribou North Electoral District
Caribou Regional District
Bella Coola
Hagensborg
Central Coast Regional District
Rivers Inlet
Owikeno Lake
Mount Waddington Regional District
North Island Electoral District
King Island
Klemtu
Bella Bella
Princess Royal Island
Hartley Bay
Gil Island
Pacific Ocean
Prince Rupert
Port Edward
Porcher Island
Kitkatla
Dolphin Island
Pitt Island
Banks Island
Skeena Queen Charlotte Regional District
Alaska
Old Massett
Masset
Yakoun River
Port Clements
Graham Island
Queen Charlotte
Haida Gwaii/Queen Charlotte Islands
Naikoon Provincial Park
Gwaii Haanas National Park
Hornby Island
Niagara Hwy
Yellowhead Hwy
Kitimat-Cassiar Hwy
Gitnadoxs Provincial Park
Ksan Gitxsan Provincial Park
Khutzeymateen Provincial Park
Tahtsa Lake
Eutsuk Lake
Entiako Provincial Park
Francois Lake
Tweedsmuir Provincial Park
Tatlatui Provincial Park
Tatlatui Provincial Park
Tatlatui

Appendix D: Depiction of an ED/VA map (Kelowna-Lake Country electoral district, 61 cm x 91.4 cm)

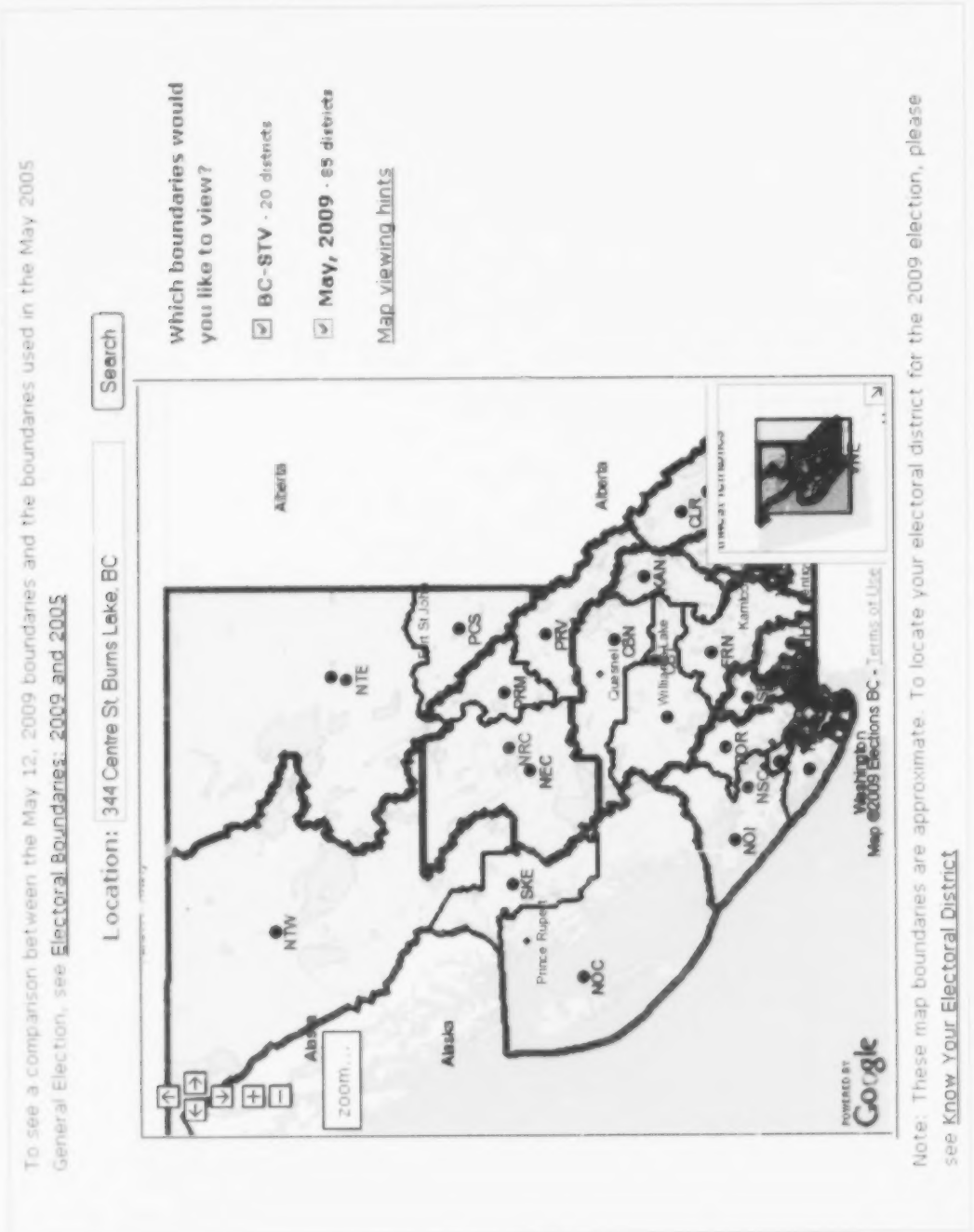
Appendix C: Depiction of a Location Index map (North Coast electoral district, 21.6 cm x 28 cm)



Appendix D: Depiction of an ED/VA map (Kelowna-Lake Country electoral district, 61 cm x 91.4 cm)



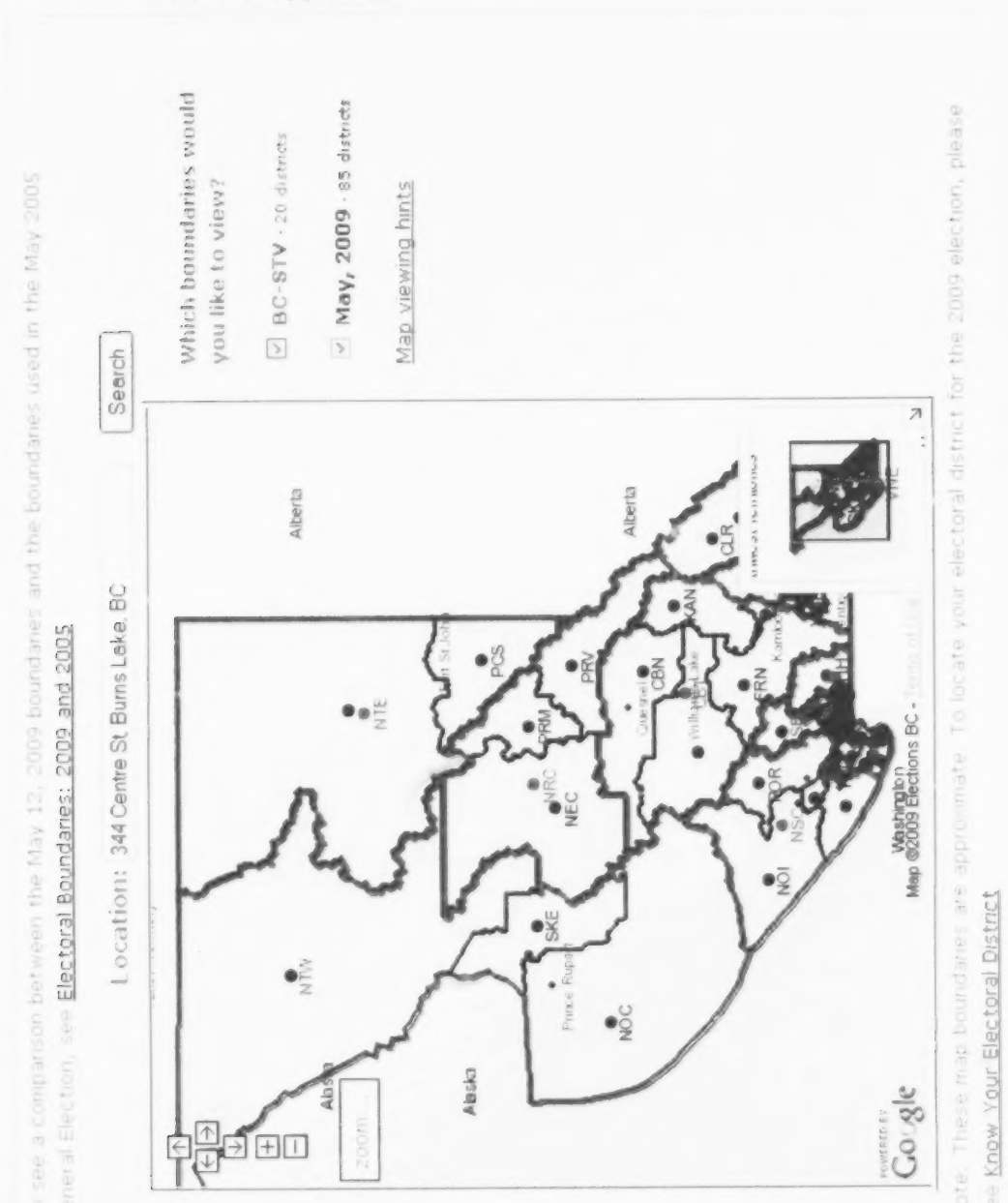
Appendix E: Screen display of the electoral system comparison website application



Appendix F: Screen display of the 2005 to 2008 voting area conversion table (Cariboo North electoral district)

2005 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA
CBN001	CBN001	CBN002	CBN003	CBN004	PRV094			
CBN002	CBN001	CBN002	CBN004	PRV094				
CBN003	CBN053	PRV095						
CBN003A	CBN053	PRV095						
CBN003B	PRV092	PRV095	PRV096					
CBN004	CBN054	CBN055						
CBN005	CBN054	CBN055						
CBN006	CBN051	CBN052	CBN053	CBN054				
CBN007	CBN050	CBN051	CBN052	CBN053				
CBN008	CBN001	CBN004	CBN007	CBN008	CBN009			
CBN009	CBN007	CBN009	CBN010					
CBN010	CBN007	CBN010						
CBN011	CBN001	CBN007	CBN008	CBN009				
CBN012	CBN001	CBN004	CBN007	CBN008				
CBN013	CBC004	CBN002	CBN003	CBN004	CBN005			
CBN014	CBN005	CBN006	CBN035	CBN037				
CBN015	CBN003	CBN005	CBN006					
CBN016	CBN011	CBN012	CBN050	CBN051	CBN052			
CBN017	CBN048	CBN049	CBN050	CBN052				
CBN018	CBN048	CBN049	CBN050					
CBN019	CBN048	CBN049	CBN050	CBN052	CBN054			
CBN020	CBN015	CBN016	CBN046	CBN047	CBN057			
CBN021	CBN014	CBN016	CBN017					
CBN022	CBN013	CBN014	CBN017					
CBN023A	CBN013	CBN018	CBN044	CBN045				
CBN023B	CBN013	CBN014						
CBN024	CBN001	CBN009	CBN010					
CBN025	CBN012							
CBN026	CBN012	CBN013	CBN019					
CBN027	CBN020							
CBN028S	CBN027S							
CBN029	CBN019	CBN028						
CBN030	CBN018	CBN030	CBN031					
CBN031	CBN030	CBN031						
CBN032	CBN021							
CBN033	CBN022							
CBN034	CBN023							
CBN035	CBN023	CBN024						
CBN036	CBN024	CBN025	CBN035					
CBN037	CBN022	CBN026						
CBN038	CBN025	CBN026	CBN[illegible]4					
CBN039A	CBN035							
CBN039B	CBN025	CBN035	CBN036					
CBN040	CBN036	CBN037						
CBN041	CBN026	CBN033	CBN034					

Appendix E: Screen display of the electoral system comparison website application



Appendix F: Screen display of the 2005 to 2008 voting area conversion table (Cariboo North electoral district)

2005 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA	2008 VA
CBN001	CBN001	CBN002	CBN003	CBN004	PRV094			
CBN002	CBN001	CBN002	CBN004	PRV094				
CBN003	CBN053	PRV095						
CBN003A	CBN053	PRV095						
CBN003B	PRV092	PRV095	PRV096					
CBN004	CBN054	CBN055						
CBN005	CBN054	CBN055						
CBN006	CBN051	CBN052	CBN053	CBN054				
CBN007	CBN050	CBN051	CBN052	CBN053				
CBN008	CBN001	CBN004	CBN007	CBN008	CBN009			
CBN009	CBN007	CBN009	CBN010					
CBN010	CBN007	CBN010						
CBN011	CBN001	CBN007	CBN008	CBN009				
CBN012	CBN001	CBN004	CBN007	CBN008				
CBN013	CBC004	CBN002	CBN003	CBN004	CBN005			
CBN014	CBN005	CBN006	CBN035	CBN037				
CBN015	CBN003	CBN005	CBN006					
CBN016	CBN011	CBN012	CBN050	CBN051	CBN052			
CBN017	CBN048	CBN049	CBN050	CBN052				
CBN018	CBN048	CBN049	CBN050					
CBN019	CBN048	CBN049	CBN050	CBN052	CBN054			
CBN020	CBN015	CBN016	CBN046	CBN047	CBN057			
CBN021	CBN014	CBN016	CBN017					
CBN022	CBN013	CBN014	CBN017					
CBN023A	CBN013	CBN018	CBN044	CBN045				
CBN023B	CBN013	CBN014						
CBN024	CBN001	CBN009	CBN010					
CBN025	CBN012							
CBN026	CBN012	CBN013	CBN019					
CBN027	CBN020							
CBN028S	CBN027S							
CBN029	CBN019	CBN028						
CBN030	CBN018	CBN030	CBN031					
CBN031	CBN030	CBN031						
CBN032	CBN021							
CBN033	CBN022							
CBN034	CBN023							
CBN035	CBN023	CBN024						
CBN036	CBN024	CBN025	CBN035					
CBN037	CBN022	CBN026						
CBN038	CBN025	CBN026	CBN034					
CBN039A	CBN035							
CBN039B	CBN025	CBN035	CBN036					
CBN040	CBN036	CBN037						
CBN041	CBN026	CBN033	CBN034					

Mailing Address:
PO Box 9275 Stn Prov Govt
Victoria BC V8W 9J6

Phone: 250-387-5305
Toll-free: 1-800-661-8683 / TTY 1-888-456-5448
Fax: 250-387-3578
Toll-free Fax: 1-866-466-0665
Email: electionsbc@elections.bc.ca
Website: www.elections.bc.ca